London Borough of Bromley
Local Air Quality Management –
Air Quality Action Plan

March 2010

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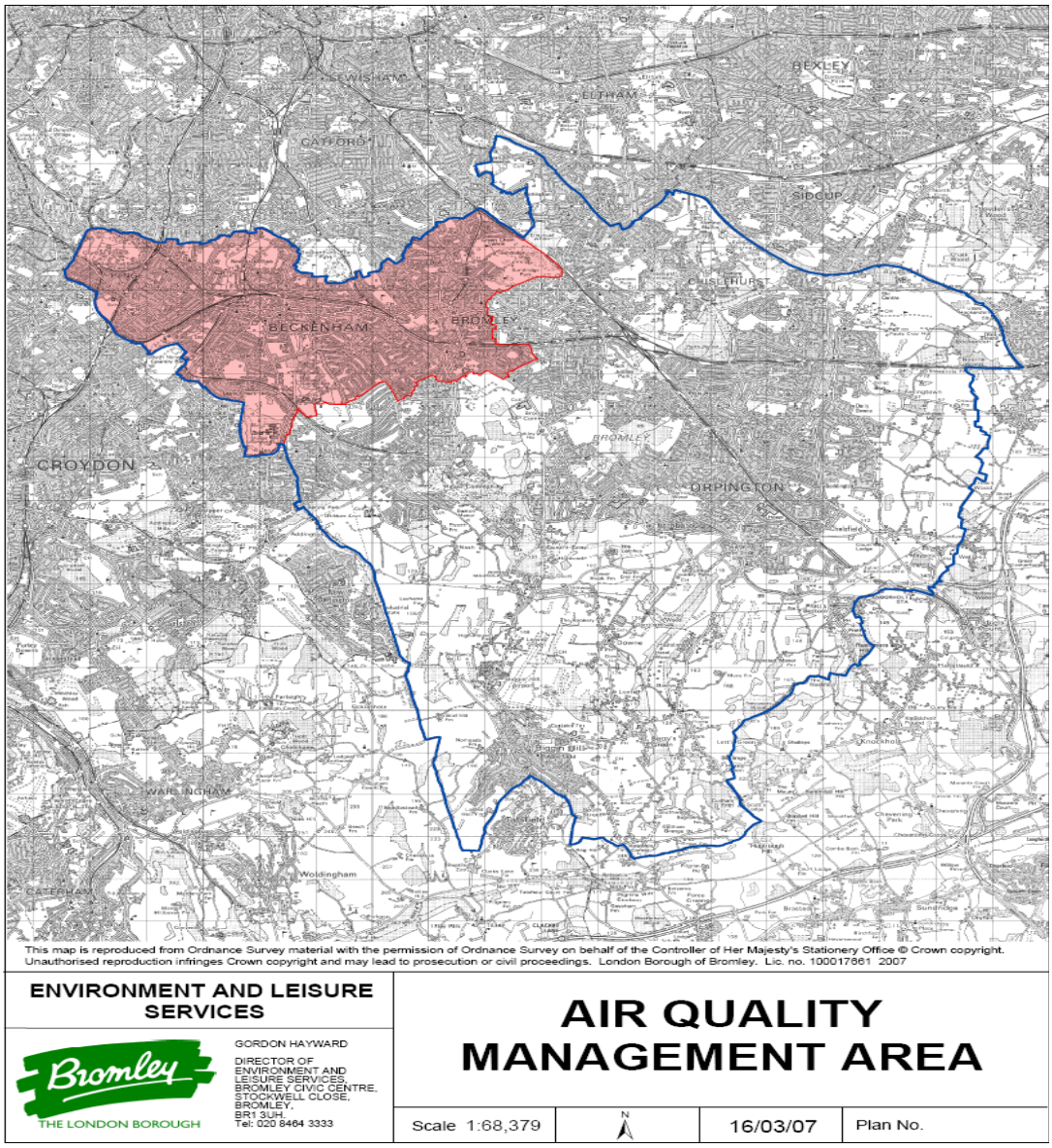
Local authorities that have declared an Air Quality Management Area (AQMA) are required to prepare and implement an Air Quality Action Plan (AQAP) and carry out further air quality assessments (Stage IV) under the Environment Act 1995. Bromley's further modelling work predicted that nitrogen dioxide would continue to exceed the air quality objective as expected from Stage III. In March 2007 the Council declared that the AQMA should cover the North and North West of the borough. The map below illustrates that those areas that are orange or darker are likely to exceed the annual average nitrogen dioxide objective of 40 μgm^{-3}.



Work carried out after the AQMA was declared has identified the sources of the pollutants (source apportionment), and this has helped this action plan focus on controlling those sources most likely to cause breaches in the air quality objectives. This focused on the twelve discrete areas situated adjacent to the most congested junctions in the borough and utilised improved air quality data gained through additional monitoring.

As it has been identified that most of the pollution is due to road traffic it follows that levels of pollution will reduce with distance from major roads. Consequently minor roads within the AQMA are likely to comply with European Union (EU) limits at certain times.

The publication of this action plan is timely as it coincides with the revision of the Council's Local Implementation Plan. The relationship between road transport and the levels of Nitrogen Dioxide (NO_2) brings into focus the need for an Air Quality Action Plan (AQAP) to dovetail with the Local Implementation Plan (LIPS). The LIPS addresses issues such as modal shift, reducing traffic volumes at "pinch points" and freight movement within the borough. The success of the numerous initiatives of the LIPS will clearly have a direct impact on the reduction of levels of NO_2 and as such the success of the AQAP.

1.0 Introduction

1.1 Background to the London Borough of Bromley

The London Borough of Bromley is located in the south east of the capital and, with 58.5 square miles, is geographically the largest London borough. It includes Beckenham, Orpington, West Wickham, Crystal Palace, Cray Valley, Penge and Biggin Hill. It shares boundaries with the London Boroughs of Bexley, Lewisham, Greenwich, Lambeth, Southwark, Croydon and the Counties of Kent and Surrey.

Although the Borough is only 12 miles from central London, it contains more than 35 square miles of protected countryside, woodland and parks. This mixture of rural space and suburban development defines much of the Borough's unique character.

1.1.1 Population

The most recent comprehensive population statistics are found in the 2001 UK census. This showed that the total population was approximately 295,530. The census also shows that there were 125,866 households in Bromley, the third highest in Greater London. There were 55,444 children under 15 years of age and 63,710 people aged over 60. All indications are that these figures continue to increase each year.

Over 30% of the population were households with two or more cars or vans with 45.2% of the working population travelling to work by car and 36.3% travelling to work using public transport, the majority of which was by train commuting to central London.

1.1.2 Social and Economic structure

Bromley is part of the South London sub-region defined in the London Plan with its location providing a transitional function between the economic centre of London and the regeneration objectives in the Thames Gateway Corridor and Kent County Council. Bromley has a substantial share of the local employment in high value added sectors, such as financial and business services, though the retail/service and public service sectors account for 37% of jobs. The Glades Shopping Centre and Bromley town centre itself is the retail hub for the borough with satellite towns such as Orpington and Beckenham offering additional retail centres.

1.1.3 Environment

Over half of the London Borough of Bromley consists of green belt countryside. This includes a mix of farmed land, historic villages, horse

paddocks, woodland chalk grassland and more. Bromley is the greenest London Borough, with over half its area consisting of open countryside, making up an important part of London's Green Belt.

Bromley has more trees than any other London borough and owes much of its special character to the trees that are growing in its streets, parks, open spaces, woodlands and private gardens. Trees increase the level of oxygen in the atmosphere, absorb noise, reduce air pollution and even increase property values. There are 44 conservation areas in Bromley some of which have additional planning requirements that aim to protect these trees though housing stock shortages increase pressure on undeveloped land within the borough.

The northern and western parts of the borough are more densely populated than the south and it is this region that has been declared an AQMA (see appendix 2). The increased density of housing and congested traffic is in stark contrast to the aforementioned green belt areas and it is these urban areas that present the biggest air quality challenges.

1.1.4 Transport

The transport networks in Bromley reflect the Boroughs geography, with different travel characteristics in the densely populated northern areas, the suburban town centres and the rural green belt areas in the south. Public transport includes bus and rail with some twenty six stations and Tramlink. There is also a small commercial airport, Biggin Hill, to the southwest of the borough.

There is a high level of car dependency in Bromley with the third highest car ownership rates in London and a highly mobile population. Relative to other London boroughs, there is low accessibility to public transport particularly for orbital journeys as a result of low-density development that can isolate those without car access. There is a growing severity of peak time traffic congestion associated with work and school run journeys. However, Bromley has the lowest level of vehicle delay per km of main road of any London borough (ref: Transport for London (TFL) Road Network Performance & Research Team Technical Note 3, April 2006).

There are three TLRN (Transport for London Road Network) roads in Bromley. These include the A21 and A232, parts of which fall within the AQMA. Of the 70km of principal roads the Council maintains the A212, A222, A224, A232 and A234 which also experience congestion at peak times and are designated as strategic roads under the Traffic Management Act 2004.

In January 2007 Bromley's Local Implementation Plan (LIP) was finalised. A significant part of the plan relates to the efficient movement of traffic around the borough. Stationary vehicles in traffic congestion can lead to an increase in emission of pollutants such as NO_2 and PM_{10}. Improving traffic flows and reducing traffic congestion at "pinch points" will contribute to reducing the roadside levels of key pollutants.

Work has already been undertaken with key partners to help identify congestion bottlenecks so that new traffic schemes can be introduced to improve traffic flows. To date two key junctions within the AQMA have been identified and should result in improvements in pollution levels if the flow of traffic is improved through these initiatives. Additional traffic survey work and air quality data collection will continue to assist in prioritising the most problematic junctions. The introduction of real time traffic with variable messages for Bromley town centre is under consideration.

In 2008 the Low Emission Zone (LEZ) was introduced across London (see appendix 4) with the aim to improve air quality by deterring the most polluting vehicles from driving in the area. Bromley's transport fleet complies with the requirements of the LEZ.

1.1.4.1 Car clubs and travel plans

Research indicates that breaking the link between car use and car ownership can lead to a significant change in travel behaviour. To exploit the findings, the Council continues to encourage the formation of Car Clubs. A Car Club provides its members with quick and easy access to a car for short term hire. Members can make use of the Car Club vehicles as and when they need them.

Bromley Council was awarded £20,000 by TFL in 2006/07 to implement Workplace travel plans (WPTP). Bromley's WPTP is a short, medium and long term travel management strategy which seeks to deliver sustainable objectives through a detailed annual action plan. Work has initially focused on the civic centre where a large number of staff are based and will continue to be resources in house with the help of existing officers.

There are 14 schools in Bromley and a combined pupil population of almost 50,000 children, many of whom travel to school by car. The Council is seeking to develop strong links with the school travel plan coordinator to help identify and target those schools that due to their proximity to the more congested junctions have a proportionally greater impact on the quality of air

1.1.4.2 Freight movement

Freight movement makes a significant contribution to congestion and air quality. Therefore optimizing freight movement could dramatically improve air quality. TFL funds the operation of the South London Freight Quality Partnership (SLFQP) across the boroughs of Croydon, Bromley, Wandsworth, Merton, Sutton and Lewisham. Its aims include reducing the impact of freight journeys in South London on air pollution, whilst at the same time improving the efficiency of freight operation in the area, improving road safety and reducing noise.

1.1.4.3 Railways

Bromley does not form part of the underground network and therefore access to the rail network is crucial to an integrated transport system serving the population of Bromley. However diesel trains can be a significant source of air pollutants. Consequently the Council will continue to encourage railway companies to adopt policies to reduce emissions from railways within the borough.

1.1.4.4 Biggin Hill Airport

In 1994, the Council entered into 125 year lease of the airport with Biggin Hill Airport Limited (BHAL). Air quality monitoring around the airport indicates no exceedences of locally sourced pollutants which reflects the relatively small number of flights. To enable air quality monitoring to continue, support and agreement is being sought to commission a real time automatic monitoring station for both PM_{10} and NO_x.

1.1.5 Health

Bromley is one of the least deprived London Boroughs. However, there are areas of considerable deprivation where life expectancy and the standard of living are lower.

Bromley has a lower Standardised Mortality Ratio compared to London or England and Wales. However, differences do occur between the sexes and between different parts of the borough including the wards of Bickley, Crystal Palace and Penge which fall within the AQMA.

Male life expectancy at birth (77 years) is amongst the highest of all the London Boroughs, while female life expectancy is in the second highest tier (approximately 81 years) following Harrow and the City of Westminster.

Along with Bexley, Richmond-upon-Thames, Kingston-upon-Thames and Merton, Bromley has one of the lowest Infant mortality rates in Greater London.

The Council also subscribes to the airTEXT service which provides a text message to registered users vulnerable to air quality issues. The Council is currently seeking to raise the profile of this service.

Air pollution harms human health and is known to increase the incidences of respiratory and lung diseases, particularly in sensitive groups of people such as young children and the elderly. In the London Borough of Bromley, the major source of air pollution is road vehicle emissions.

The pollutant of most concern in Bromley is nitrogen dioxide (NO_2) which in certain parts of the borough, fails to comply with national health-based standards and on current trends is unlikely to meet these standards by Government target objectives of 2010 (Appendix 1). On this basis, Bromley declared an AQMA in March 2007.

Bromley's Stage IV assessment modelling was completed in February 2008 using new emissions data; this showed that annual mean NO_2 concentrations were predicted to exceed Government objectives in the North and North West of the borough.

In developing this action plan, Bromley has taken into account guidance from the Government, Environmental Protection UK (EPUK) and the Air Quality Strategy produced by the Mayor of London. The action plan sets out both current and new actions to address the air pollution problem in Bromley and to work towards meeting national air quality objectives.

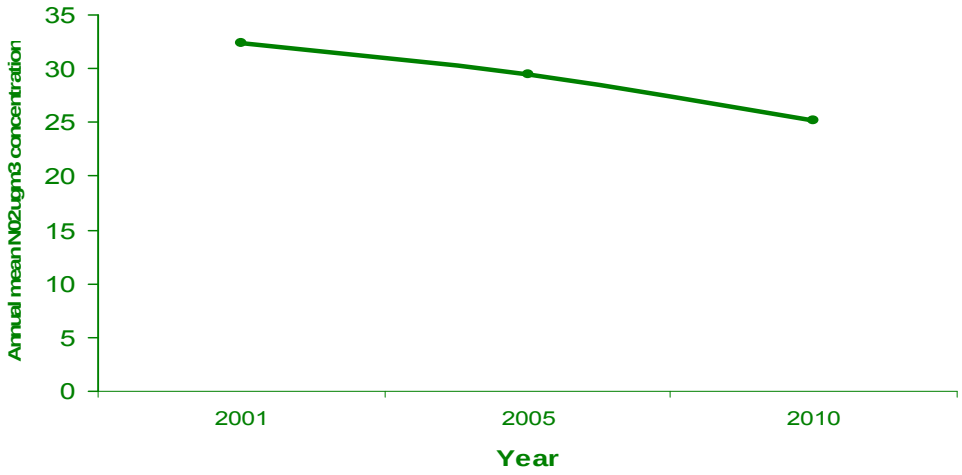
Research in 2003 showed that 53% of nitrogen dioxide in Bromley was due to road traffic, 45% gas combustion and 2% due to trains.
The council also works closely with neighbouring boroughs including cluster and working groups on current issues including tackling technical and policy issues.

1.2 Current air quality in Bromley

Bromley has and will continue to meet all but one of the objectives listed in Appendix 1, with only the annual mean target for nitrogen dioxide of $40\mu gm^{-3}$ being exceeded. Away from busy roads the levels of nitrogen dioxide fall rapidly and are significantly below the air quality objective levels. However, current air quality monitoring indicates there will be exceedences of this target at roadside locations.

The data below shows the average annual mean background concentrations within the AQMA. The background concentrations are projected to fall from an average of 32µgm^{-3} to 25µgm^{-3} whereas modelled concentrations at roadside junctions in the same area will remain above the government target of 40µgm^{-3} unless action is taken.

Figure 1 Annual mean nitrogen dioxide background concentrations within the AQMA



Air quality monitoring has been undertaken in Bromley since 1993 at various roadside locations. As the following Figures illustrate, air quality levels can vary from year to year, with local weather conditions being a critical factor. Hot summers or dry cold and still winters can lead to higher pollution levels since pollutants are not dispersed.

Figure 2 Nitrogen dioxide levels in Bromley 1993-2007 by monitoring station location

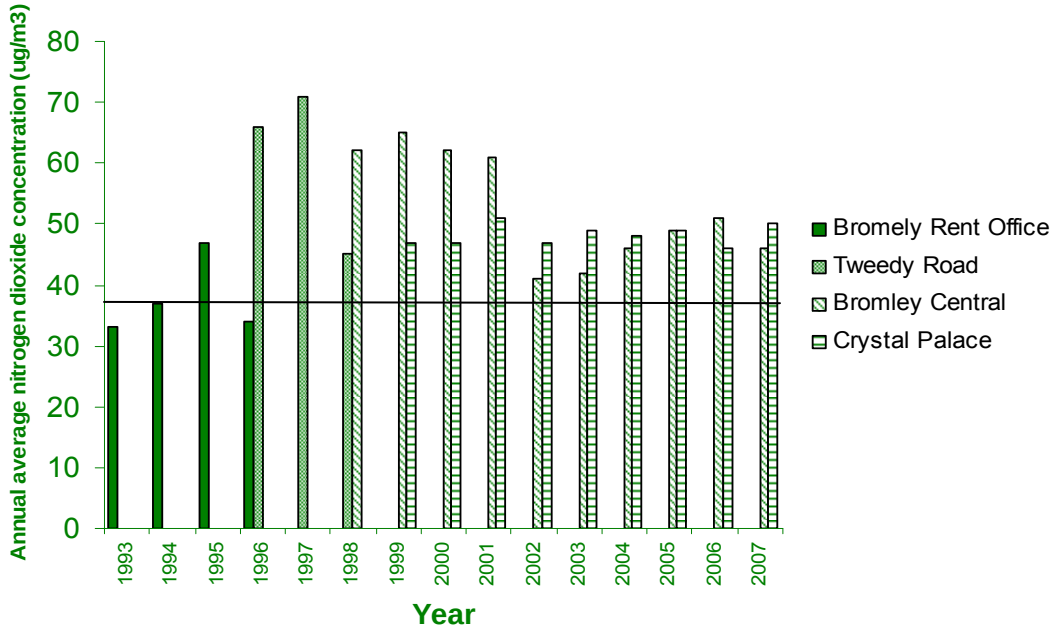
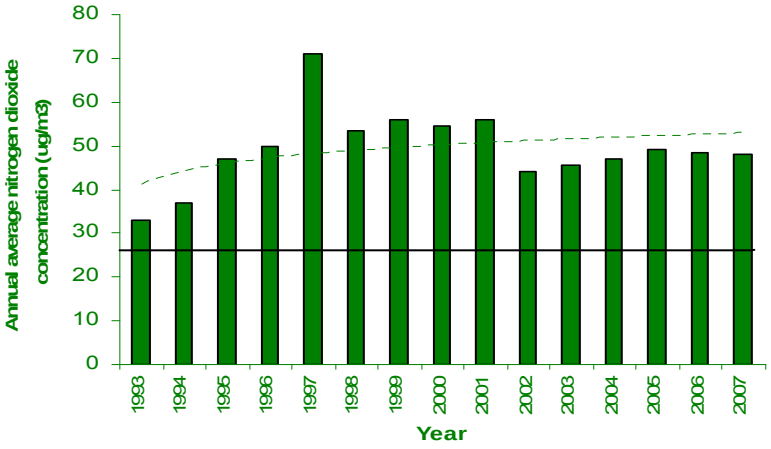


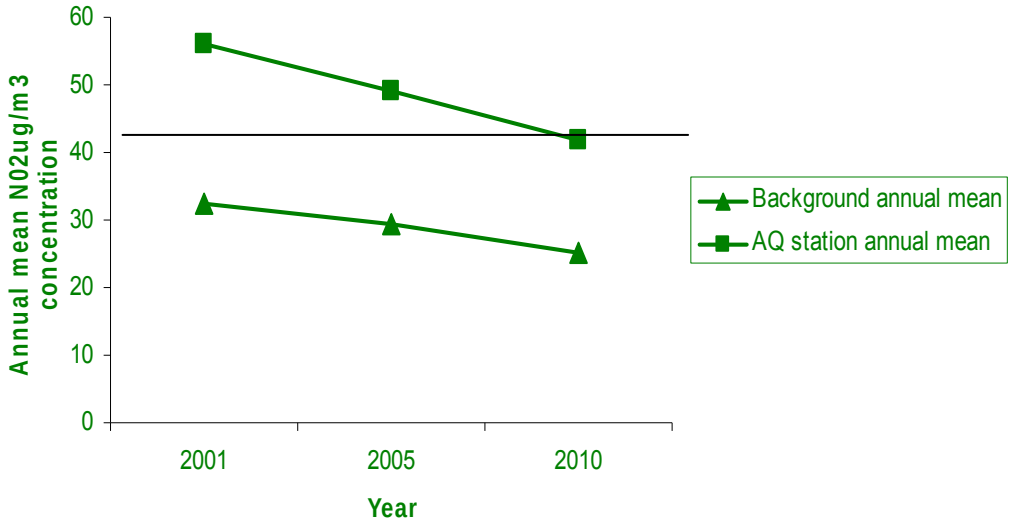
Figure 3 Annual average Nitrogen dioxide levels in Bromley 1993-2007



The above shows air pollution levels averaged for the whole year since 1993. Modelling studies have shown that between 2007 and 2010 there is an anticipated fall in not only the background concentrations but also at the monitored roadside locations of the annual mean nitrogen dioxide levels. The Figure below illustrates this anticipated predicted fall based on the London Atmospheric Emission Inventory (LAEI) 2004. However, despite these predicted falls, it is still anticipated that measured roadside

concentrations within the AQMA will not fall below the government target of 40 μgm^{-3}.

Figure 4 Annual mean nitrogen dioxide concentrations



As stated the background annual mean concentrations of Nitrogen Dioxide has continued to fall and these falls have been mirrored by a reduction in the measured levels at the air quality monitoring stations. However, on current trends these reductions will not be sufficient to meet the EU limit value of 40 μgm^{-3}. The successful implementation and adoption of the measures outlined in this action plan will contribute to meeting these targets.

The source apportionment Stage IV study has highlighted that background concentrations contribute greatly to the elevated NO_2 concentrations throughout the Borough. Cars and heavy goods vehicles (HGVs) contribute similarly and buses contribute the least. In order to reduce total oxides of nitrogen (NOx) and therefore NO_2, all road transport emissions should be focused on particularly cars and HGVs.

For emissions from industrial processes, the Council continues to ensure that emissions from all 'prescribed processes' remain controlled and regulated in line with national policy and conditions of issued permits. A cost accounting and risk based assessments will be introduced in order to identify the more potentially polluting installations within LBB.

The Council also has powers under the statutory nuisance provisions of the Environmental Protection Act 1990 and will continue to to investigate complaints and take enforcement action where necessary to abate statutory nuisance and prevent pollution to the air.

The Council will encourage the conversion of those large boilers that still use heavy fuel oil in Bromley to lighter fuel oils or gas.

1.3 Consultation

Public consultation has been undertaken on this action plan. Appendix 5 lists the organisations who were formally invited to submit their comments on the action plan. The consultation was also published on the Council's web site and featured in the local press.

In general the response to the public consultation was positive including those from elected members of the London Borough of Bromley.

Responses were also received from the Planning Officer to Ravensbourne Valley Preservation Society and the Greater London Authority (GLA). Their comments have been taken into account, particularly those of the GLA who considered that insufficient detail had been provided regards how the proposed actions would enable air quality objectives to be met, have been taken into account in this revised action plan.

1.4 Cost and benefits of the proposal

A simple cost benefit analysis of the proposals in this plan has been undertaken in terms of the likely air quality impacts and the likely costs. This is set out in Appendix 6. Other anticipated benefits such as benefits on climate change have been noted. For cost analysis, low indicates estimated annual average costs to the Council of under £10,000, medium £10,000 - £15,000 and high more than £15,000.

2.0 Actions proposed

2.1 Construction and demolition activities

Proposal 1. The Council will mitigate against or resist development that is likely to cause air quality objectives to be breached, particularly within designated Air Quality Management Areas.

Large developments can be a significant source of airborne particles through demolition and construction activities and associated vehicle movements. These dust particles can exacerbate respiratory illness albeit on a very local scale. In 2006 the GLA and London Councils produced 'Best Practice Guidance' to control dust and emissions from construction and demolition. The Guidance will be used to inform the planning process within Bromley; assisting developers in understanding the methods available to them and what Bromley might expect.

In addition Bromley uses planning agreements to ensure good practice is followed by developers but if complaints are received during construction environmental health will investigate and if necessary take formal action requiring the works to cease until the dust levels are reduced to satisfactory levels.

The Bromley UDP policy ER6 states:

"In considering proposals for development with a potentially significant direct or indirect impact on air quality, the Council will require submission of an assessment of that impact. The Council will resist development that is likely to cause air quality objectives to be breached, particularly within designated Air Quality Management Areas"

This policy illustrates a clear commitment to minimizing the impact on air quality when considering new construction and/or demolition.

Bromley will continue to work closely with developers and contractors to find ways to minimize the impact on air quality throughout the development work. Measures include:

- Damping down stockpiles on open dusty areas
- Screening dusty areas
- Promote the usage of hard surfaces on haul routes and/or wash or damp down
- Ensure all loads entering or leaving site are covered
- Ensure vehicles are switched off when not in use i.e. no idling
- Encourage usage of particulate traps and regular vehicle service

- Wash wheels of vehicle leaving site if close to sensitive receptors
- Ensure mobile concrete crushers and screeners are operating in accordance with the Local Air Pollution Control Part B regime permit conditions

2.2 Bonfires

Proposal 2. The Council will support and investigate the case for promoting a restriction on bonfires based on area and time

Previous government best-practice documents state that under the Clean Air Act 1993, bonfires are not recommended for demolition or construction sites and if unavoidable, they should be supervised at all times. Bromley prefer to set conditions that prevent any bonfires on site. Taking into account the Clean Air Act 1993 and nuisance legislation, i.e. Environmental Protection Act 1990, this Best Practice Guidance recommends that:

- No burning of any material is permitted on site.
- All excess material should not be wasted, but used or safely removed from site according to appropriate legislation.

2.3 Planning and mitigation

Proposal 3. Investigate the use of Section 106 agreements for future developments within the AQMA.

Proposal 4. Encourage the use of the Mayor of London's sustainable design and construction supplementary planning guidance to mitigate against inappropriate design, layout, orientation and construction to avoid increased exposure.

The planning process, if appropriately enforced, can have a direct and positive impact on the quality of air. Only zero emission developments are unlikely to have any impact on local or global air quality and as such mitigation of these impacts should be a consideration for all developments. With land at a premium and a lack of housing stock, increasingly narrow strips of land located at busy junctions, that were previously retail sites such as service stations, are now being built on. Clearly these new developments if not properly designed can lead to residents being exposed to the higher levels of pollution from road traffic emissions.

Careful consideration should be given to the site characteristics of the development to minimise unnecessary exposure. The appropriate sighting of outdoor spaces such as children's play areas, roof terraces and rooms of primary occupation should be encouraged.

Section 106 of the Town and Country Planning Act 1990 used through the planning process is often an effective route to ensure that developers take on board these environmental considerations. A Section 106 agreement requires developers to provide assistance and support to the Local Authority in pursuit of the AQAP. The assistance can take the form of travel plans, air quality monitoring or alternatively fuelled vehicles.

2.4 Industries

Proposal 5. The Council will ensure all new installations are bought into the relevant regime and existing installations are kept informed of new legislative requirements under the Pollution Prevention and Control Act 1999 and Solvent Emissions Directive

Prescribed processes are those industrial technologies that have the potential to cause air pollution. The Environmental Protection Act 1990 required that processes identified in the act or by regulations made under the act, must have an authorisation to operate.

Following the introduction of the Pollution Prevention and Control Act 1999, the system of authorisation changed to meet the requirements of the European Directive on Integrated Pollution Prevention and Control (IPPC). The new act covers a wider range of industrial processes than the Environmental Protection Act 1990, using A1, A2 and B classifications, with the Environment Agency controlling the larger and potentially more polluting Part A1 processes and Local Authorities controlling those classified as A2 and B.

Currently there are no Part A or A2 processes in London Borough of Bromley, but with 111 Part B processes the potential to pollute without appropriate control and enforcement is considerable. Of these 111 industrial installations the vast majority are the smaller lesser polluting sites such as petrol service stations and dry cleaners.

A full list of the Part B processes in Bromley can be found on our website at http://www.bromley.gov.uk/environment/envhealth/pollution/air/.

Part B processes pay an application and an annual subsistence fee to the Council and have to comply with the statutory permits which may include the need to implement further pollution controls, but this will obviously vary

with the process and controls needed. The Council undertakes permit checks on each process in accordance with Department of Environment Food, and Rural Affairs (DEFRA) guidance and responds to complaints where applicable.

The main benefits of controlling pollution from Part B installations is to residents in the locale as these processes have the potential to be a nuisance during operating hours. There are also wider benefits including reducing particulate and volatile organic carbon (VOC) emissions.

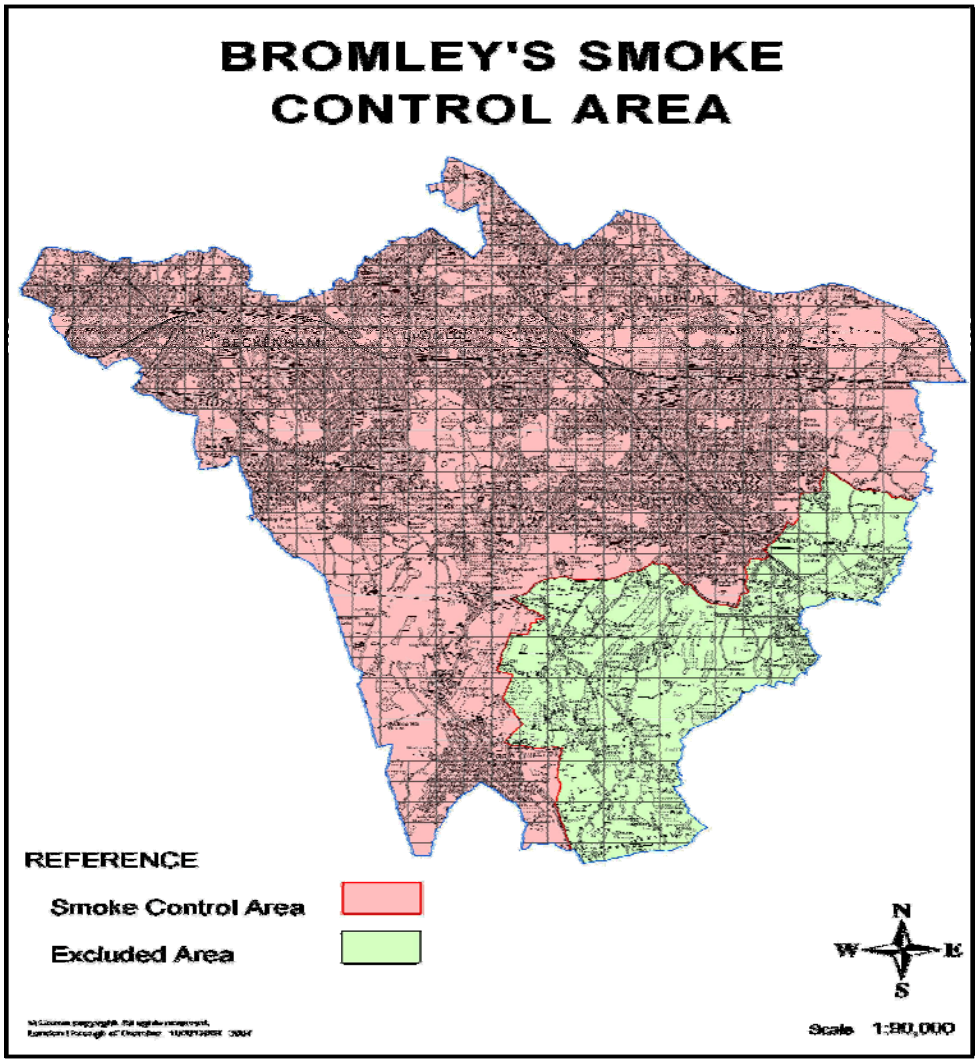
2.5 Smoke Control

Proposal 6. The Council will continue to inform residents of the smoke control areas and where necessary take enforcement action if un authorized fuels are burned or unauthorized appliances used.

Prior to the 1970's the principle concern relating to air quality in London was smoke and sulphur dioxide produced through the burning of fossil fuels i.e. coal and oil in domestic properties and industry. The Clean Air Acts of 1956 and 1968 were introduced to deal with the smog of the 1950s and 1960s. The acts gave local authorities powers to control emissions of dark smoke, grit, dust and fumes from industrial premises and furnaces and to declare "smoke control areas" in which emissions of smoke from domestic properties are banned.

Throughout the 1960s and 1970s Bromley introduced an increasing number of smoke control areas to address the air pollution of the day and to ensure the great smog of 1952 did not reoccur. The geographical extent of these smoke control areas was determined by the ward boundaries of the time with only Darwin ward and Chelsfield ward being exempt from smoke control. Since this time these boundaries have evolved and as such certain areas of Darwin ward and what is now Chelsfield and Pratts Bottom ward are exempt while others are enforced. Currently the whole of the borough is deemed a smoke control area other than the more rural south east of the borough. Figure 5 shows the current smoke control areas.

Figure 5 Bromley's Smoke Control Area



Recent price increases in the cost of domestic fuel has lead to an increasing number of residents installing wood burning stoves to supplement their heating costs and as such smoke nuisance from domestic properties continues to be an issue

2.6 Oil and Gas Heating

Proposal 7. Where possible the Council will encourage, through the planning process, developers or new business premises to use low NO_x burners or other cleaner fuels including the Sulphur Content of Liquid Fuels (England and Wales) Regulations 2007*

Proposal 8. The Council will promote energy efficiency and sustainability on new developments by supporting the Council sustainability and energy efficiency policy through the planning process.

Proposal 9. The Council will encourage efficient local energy generating schemes, particularly combined heat and power and community heating schemes through the Mayor's Energy Strategy and the Mayor's London Plan (Spatial Development Strategy).

Proposal 10. The Council will encourage energy efficiency measures and insulation of domestic dwellings to reduce energy use.

Previous data has shown that the heating of domestic and commercial property has accounted for 13% of all NO_x emissions in London (Source: London Atmospheric Emissions Inventory (LAEI) 2004). Currently this is a relatively small percentage of total emissions but may become more significant if vehicle emissions continue to fall.

Based on the 2004 LAEI around 45% of all NO_x emissions in Bromley are from domestic and commercial gas emissions, which is relatively high compared to a number of other London Boroughs. Furthermore the contribution is due to increase to around 58% by 2010. This relative increase is primarily due to the predicted reduction in contribution from road traffic (i.e. as vehicles become cleaner they will make less of an overall contribution) but is also caused by an increase in the number of dwellings due to a housing shortage and also an increase in single occupied home.

Clearly any initiative to reduce the relative contribution of NO_x gas emissions will need to dovetail with the Councils sustainability and energy management programmes furthermore it is worth noting measures to increase energy efficiency not only assist local air pollution but because it can save people money and reduce global pollution.

2.7 Holistic approach to air quality

Proposal 11. Improve links with the energy and housing officers in order to adopt a more holistic approach to air quality

When planning to tackle air quality improvements it is essential to consider how the impact air pollution on a local level can affect global pollution levels and climate change. While pollutants such as nitrogen dioxide have a direct impact on the health of individuals at a local level, greenhouse gases such as carbon dioxide may contribute towards global problems. Local air pollution is heavily influenced by meteorological conditions, and in recent years the global warming effect has been felt at a local level with the hottest summers on record occurring. These warmer years have also resulted in a number of local pollution episodes.

Good practice acknowledges that these two issues are not dealt with in isolation but through a bottom up approach and adoption of a number of local initiatives improving air quality at a local level can have a positive impact on global warming issues.

Bromley can help resident's reduce their fuel bills, keep warmer during the winter months and reduce the Borough's carbon footprint. As a Council we are committed to providing information and advice on energy efficiency and renewable energy, and administering and promoting grants and discount schemes to help achieve these aims.

Renewable energy grants are available from Central Government which contributes towards the cost of installing solar water heating, solar photovoltaics, wind turbines, small-scale hydro turbines, ground/water/air source heat pumps, bio-energy, renewable CHP, Micro CHP and fuel cells. Bromley helps facilitate these through advice and information.

2.8 Air quality Monitoring

Proposal 12. Continue to monitor air quality in Bromley, particularly for pollutants of concern such as Nitrogen Dioxide and PM_{10}.

Proposal 13. The Council will seek ways to improve publicity of pollution data and its availability to the public.

Since 1997 Bromley has undertaken a rigorous assessment of local air quality. These ongoing assessments are a legal requirement under the Environment Act 1995 and The National Air Quality Strategy 2000, legislation which sets out health based standards for seven priority pollutants.

The reports that represent this work have been the catalyst for the declaration of the Air Quality Management Area (AQMA) in March 2007,

on the basis that NO_2 pollutants were predicted to exceed national objectives by 2010. Bromley has completed the stage IV further modeling of NO_2 using the latest data and additional NO_x diffusion tube data in parallel with developing this action plan.

The predictions are based on modelled results and data collected from monitoring sites within the borough and the emissions inventory. Air quality modelling requires accurate data as the accuracy of the results are dependent on the modelling data. It is therefore essential to any Air Quality Action Plan (AQAP) that Bromley continues to collect air quality monitoring data in order to validate the accuracy of these models and also to inform the public of any progress made in relation to improved air quality.

2.8.1 Air Pollution Monitoring sites

There are currently 3 modern automatic air pollution monitoring stations in Bromley, the details of which can be seen below. The data collected from these stations is supplemented with additional NO_x diffusion data from an additional 10 locations targeted at major road junctions within the AQMA.

Diffusion tubes consist of a small tube (test-tube size), one end containing a pad of NO_2 absorbing material, the other end is opened for a set exposure time. The amount of NO_2 absorbed is determined by adding a reagent to form a coloured 'azo' dye, the optical density of which is measured in a laboratory using a spectrophotometer, to determine the average NO_2 concentration.

The laboratory used to carry out the analysis can significantly affect the results from NO_2 diffusion tubes. For this reason, best practice is to use three tubes at each monitoring point, and to co-locate one set with an existing continuous chemi-luminescent monitor. Hence, any bias can be corrected by referring the results back to the continuous monitor, and the three tubes will identify any anomaly. Bromley follows this best practice principal and co-locate 3 tubes at Harwood Avenue with 3 tubes located at 9 other locations (see appendix 5).

Bromley also have two mobile gravimetric samplers that can be dispatched and located in any area in the borough and are of particular use in monitoring particulate matter (PM_{10}). These sequential samplers can hold up to 15 filter holders and as such can be programmed to sample for a 15 day period

2.8.2 Air quality monitoring station details

*Bromley 7 central, Harwood avenue (grid ref 540400,169400)
Classification: Roadside
QA/QC:AURN/LAQN standard
Monitoring Dates: 06 July 1998 to present
Distance to Road: 7 metres
Sampling Height: 3.5 metres
Species Monitored: Carbon Monoxide. Nitrogen Dioxide. PM_{10} Particulate (by BAM).

Crystal Palace 1, Crystal Palace Park Parade (grid ref_533900, 171190)
Classification: Roadside
QA/QC:LAQN standard
Monitoring Dates: 29 September 1999 to present
Distance to Road: 4 metres
Sampling Height: 3 metres
Species Monitored**:** Carbon Monoxide. Nitrogen Dioxide. PM_{10} Particulate (by TEOM). Sulphur Dioxide

Biggin Hill 5, Biggin Hill Junior School, Old Tye Avenue, Biggin Hill (grid ref 542387, 159254
Classification: Suburban
QA/QC: LAQN standard
Monitoring Dates: 01 April 1996 to present
Distance to Road: NA
Sampling Height: NA
Species Monitored: Ozone

2.9 Public awareness and education

Proposal 14. Develop the London Borough of Bromley website to include real time air quality monitoring data.

Though air quality data provides invaluable information, to tackle air quality issues it is essential that the data is made available to as wide an audience as possible to help educate and change behaviour. We have recently joined the air text service, a service that sends free text, voice and email message air pollution alerts to mobile phones, landlines and computers of people with asthma, bronchitis, emphysema, heart disease and angina, when air pollution levels are forecast to be moderate, high or very high.

People can register for airTEXT online at www.airtext.info.

Bromley currently provides information on air pollution in a number of ways both real time information via the www.londonair.org.uk website and also more general information available through the Council's web pages, www.bromley.gov.uk.

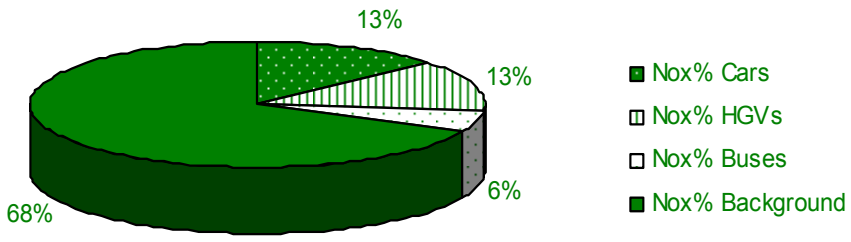
2.10 Transport sources

2.10.1 Reduce emissions from road vehicles

Like many Local Authorities both in Greater London and nationally the largest source of air pollution in Bromley is road transport. Proportionally the contribution road traffic makes to air pollution in London is higher than that outside of the capital and is primarily due to higher traffic flows and increased congestion. There is also a relative lack of large industrial installations such as power stations which are a contributing factor to air pollution in other authorities.

Road traffic contributes around 52% of NO_x emissions (% in Bromley based on LAEI 2003) though with vehicle technology enhancement and other initiatives this is set to fall to around 38% by 2010. However, some road vehicles release considerably more atmospheric emissions than others. Figure 7 is a summary of the relative contributions by the main vehicle types - cars, buses and heavy goods vehicles (HGV). These relative contributions differ throughout the AQMA, though in all areas the majority of NO_x contributions can be attributed to the background concentrations.

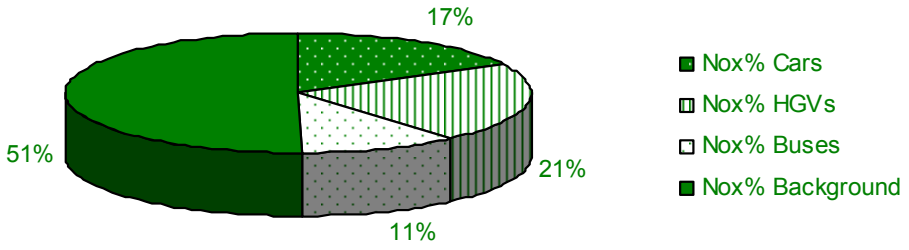
Figure 6 Average NOx percentage within the AQMA in 2007



The chart illustrates that throughout the AQMA the relative contribution from traffic sources can be equally split between cars and HGVs. However

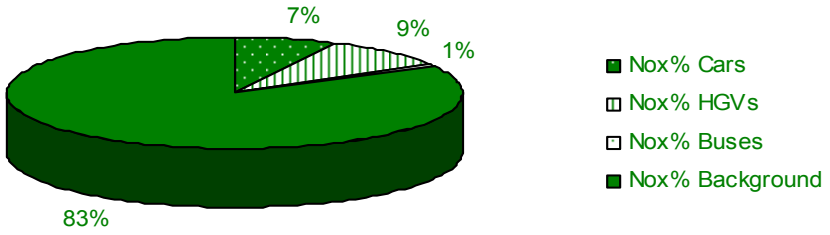
in certain areas, such as the A21, the contribution of freight travelling to and through the borough can be felt with the HGV contribution rising to 21% and the relative background concentration falling.

Figure 7 Average NOx percentage within Bromley Common Area in 2007



In areas where there are currently fewer freight and car movements the relative contribution falls.

Figure 8 Average NOx percentage within Anerley Hill Area in 2007



These figures illustrate that all road traffic sources need to be tackled if a net improvement in air quality is to be made. In April 2008 a further modelling assessment was carried out to calculate the necessary reductions in NO_x needed in order to meet the annual mean NO_2 2010 objective within the AQMA. The chart below shows the reductions required to meet these targets and further highlights the important contribution transport emissions have to poor quality.

Figure 9 Percentage NOx reduction required

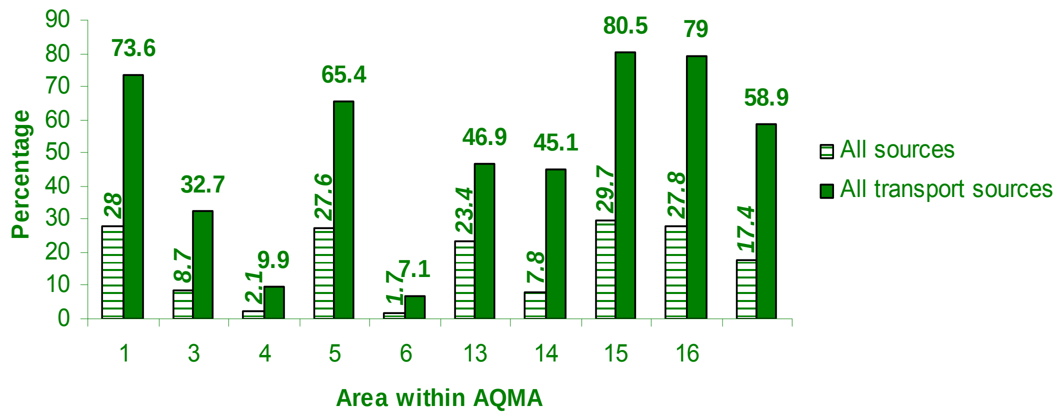


Table 1 Percentage NOx by source

Area	NOx% Cars	HGV's	Buses	Background
Area 1, Elmers End	**18**	**17.3**	2.8	61.9
Area 3, Bromley Road / Beckenham Lane, Shortlands	13.4	9.7	3.5	73.3
Area 4, London Road, Bromley	10	8.3	3.0	78.6
Area 5, Widmore Road / Kentish Way, Bromley	14.5	17.3	10.5	57.7
Area 6, Burnt Ash Lane / College Road, Sundridge	11.2	7.6	4.4	76.8
Area	**Cars**	**HGV's**	**Buses**	**Background**
Area 13, Masons Hill / Bromley Common, Bromley	15.2	15.5	6.2	63.1
Area 15, Penge Road / Anerley Road, Anerley	**17.3**	**21.4**	**11.1**	**50.1**
Area 14, Anerley Road, Crystal Palace	13.8	13.9	7.5	64.9
Area 16, Crystal Palace Park Road, Crystal Palace	7.2	8.9	1.0	**82.8**
Average	13.4	13.3	5.6	67.7

2.10.2 Background and aims

The number of vehicles on the roads in Bromley continues to increase and currently the borough has the third highest car ownership rates in London with a highly mobile population. Bromley actively encourages the population to use public transport but people do enjoy the freedom that cars offer and it is likely that car ownership and usage will increase in the future. Conventionally fuelled vehicles are becoming cleaner and cleaner but alternative fuels can offer an opportunity to reduce the levels of air pollution further.

Since 1994, Bromley has seen a 10% increase in traffic compared to only 5% in Greater London as a whole. However in recent years this rate of growth has slowed and latest data predicts that traffic growth in Bromley will meet the outer London growth target of 5% by 2011.

2.10.3 Movement of traffic

Proposal 15. Provide data and monitoring services to target problematic junctions in order to improve the movement of traffic.

The Bromley Local Implementation Plan (LIP) was finalised in January 2007 and a substantial element of the plan relates to the efficient movement of traffic both in and around the borough. Congested roads result in idling traffic which in turn leads to increased emissions of traffic borne pollutants such as NO_2 and PM_{10}. By improving the movement of traffic and reducing congestion at these “pinch points” will contribute to reducing the roadside levels of key pollutants.

Considerable research has already been carried out working alongside key partners such as Transport for London (Tfl) in an effort to identify these congestion bottlenecks. Once identified new traffic schemes can be introduced to improve the flow of traffic, reduce congestion and improve air quality.

To date two key junctions within the AQMA have been singled out for attention. Both the Junction of Masons Hill/Bromley Common with Homesdale Road and Hayes Lane and the junction of Rectory Road/High Street, Beckenham (A222)/Southern Road (A2015)/Albermarle Road would see improvements in pollution levels if the flow of traffic is improved through these initiatives.

Additional traffic survey work and air quality data collection will assist in prioritising the most problematic junctions.

2.10.4 Real time traffic information

Proposal 16. Introduction of real time traffic with variable messages for Bromley town centre

Bromley Town is the principal retail centre in the Borough and as such plays an important role for the residents, businesses and visitors to the borough. The optimal movement of traffic in and out of this centre is essential for the town centre to continue to be a vibrant and pleasant place to visit.

In Orpington town centre, proposals are well developed for the introduction of real-time car parking information, using variable message direction signs, through consultation with the developers of a new superstore. The Area Action Plan for Bromley Town Centre proposes similar technology which would, if adopted, improve traffic flow, ease congestion and thus improve air quality.

2.10.5 Council owned fleet

Proposal 17. Provide data or monitoring services to target problematic junctions in order to improve the movement of council vehicles

Proposal 18. New drivers will be trained in fuel efficient driving

Bromley has for many years been proactive in terms of minimizing the environmental impact of its vehicle operations and as such has strived to lead by example. In the past this has focused on alternative fuels but in the future simple gains can be achieved by continually assessing how the vehicles are used. The Councils transport operations division has advanced its vehicle management IT system and through improved vehicle and fuel usage data the emissions to air can be reduced through more efficient vehicle allocation i.e. the right vehicle for the right job.

Simple gains can also be achieved by continually assessing how the vehicles are driven. Smarter Driving, also known as eco-driving, is the adoption of environmentally conscious driving techniques and

environmentally optimal vehicle operation. Hence if adopted fuel consumption, and corresponding vehicle emissions, should be reduced. Factors to consider include driving behaviour, tyre type and pressure, and speed management.

In 1997 the Council acquired 26 dual fuelled vehicles using Liquefied Petroleum Gas and has since introduced two hybrid cars based at the Civic Centre for cross departmental use.

2.10.6 Vehicle Emission testing

Proposal 19. Ensure the Councils fleet complies with vehicle standard requirements of Section 83 of the Environment Act 1995

The annual MOT Test, required for every vehicle over three years old, includes the measurement of emissions carried out by authorised examiners. There are concerns about the effectiveness of the MOT systems as it is a simple test that does not truly capture the vehicles performance on the road and the corresponding emissions to air.

Roadside emission testing may be used by Local Authorities in England and Wales which have declared a traffic-related AQMA under Section 83 of the Environment Act 1995. Under these provisions, authorised personnel may carry out a roadside emission test (RET). If emissions exceed the permitted level a fixed penalty notice may be issued, or the driver may be asked to produce a certificate demonstrating that the vehicle has been fixed.

A number of Local Authorities have carried out roadside testing and on the whole it has been a useful and positive initiative. Badly tuned and operated vehicles are a significant source of local air pollution but in isolation roadside emission testing (RET) is unlikely to have a significant impact on local air quality. However from a wider perspective of public information RET can be a very effective measure in reducing emissions through education.

2.10.7 Compliance with European emission standards for vehicles

Proposal 20. We will continue to ensure our fleet vehicles comply with European emission standards.

The major source of air pollution in cities such as London is emissions from road traffic. An effective method of reducing these emissions and improving air quality has been through emission standards legislation, which has been imposed for new vehicles sold in Europe since 1992.

These standards are known as European emission standards (or Euro standards) and have been defined in a set of European Union directives. They give acceptable limits for exhaust emissions of all new vehicles that are sold in the EU, covering oxides of nitrogen, hydrocarbons, carbon monoxide and particulate matter emissions. The limits are set at different levels for different vehicle types and compliance is determined by running a vehicle's engine over a standard test cycle for a set time.

Vehicles entering much of the area located within the M25 must comply with the European standards for particulate emissions or face a levy.

Research undertaken for the London boroughs showed that the costs of implementing such an approach across London are offset by the large health benefits that reduced air pollution brings about, including an estimated 23 per cent reduction in total emissions of particles in London by 2010, and a 19 per cent reduction in the area of London exceeding the nitrogen dioxide air quality objective in 2010.

Bromley endorses this approach

2.10.8 Parking and Enforcement

The Parking and Enforcement Plan (PEP) is an integral part of the LIPS and highlights the relationships between parking, traffic movement and consequently air quality. Indiscriminate parking exacerbates congestion on the road networks which in turn can lead to increased levels of pollution often in the areas that already experience poor air quality. Effective parking policies and enforcement can ease these pressures and contribute to reducing road traffic emissions.

2.10.9 City Car Clubs

Proposal 21. The Council will encourage and support employers and other organisations wishing to establish Car Clubs and investigate the possibility of providing on road spaces available for car club vehicles where suitable off-road provision cannot be made.

A car club provides its members with quick and easy access to a car for short term hire. Members can make use of the car club vehicles as and when they need them. Research indicates that there is a significant

change in travel behaviour when the link between car use and car ownership is broken with car club members typically drive less and make more use of public transport, cycling and walking.

2.10.10 Car Sharing Schemes

Proposal 22. The Council will promote workplace car sharing schemes.

The term 'car share' refers to when a car is not occupied solely by the driver but by additional passenger(s) who make a monetary contribution towards fuel costs. Hence both the driver and passenger(s) save money with additional benefits regard congestion and air quality.

Whilst car sharing schemes may offer significant benefits, administering a borough wide scheme would be costly and fraught with public safety and liability concerns. Thus focus will be upon promotion of workplace schemes.

2.10.11 South London Freight Quality Partnership (SLFQP)

Proposal 23. The Council will play an active role in the further development and adoption of the SLFQP including among other initiative trialing of night time deliveries, loading bay optimization and feasibility studies of consolidation centres

Freight movement is a major contributor to congestion and air pollution. If the movement of this essential freight could be optimized significant gains in air quality could be achieved.

Transport for London (Tfl) has funded the establishment and operation of a sub regional freight quality partnership (FQP) across the boroughs of Croydon, Bromley, Wandsworth, Merton, Sutton and Lewisham. The Freight Transport Association, Road Haulage Association and local businesses are members of the SLFQP.

Its aims include reducing the impact of freight journeys in South London on air pollution, whilst at the same time improving the efficiency of freight operation in the area, improving road safety and reducing noise.

Specific measures proposed by the FQP are to:

- Reduce air pollution by increased use of alternatively-fuelled vehicle emissions abatement technology
- Develop freight consolidation centers

- Reduce congestion and air pollution by trialling night-time deliveries in areas where they will not affect residents
- Prepare the freight industry locally for the London low emission zone.

2.10.12 Idling vehicles

Proposal 24. The Council will reduce pollution from unnecessarily idling vehicles through an awareness campaign and enforcement.

Engines that are left idling not only contribute to air pollution but can also cause a great deal of annoyance and distress to members of the public who live in close proximity to these vehicles. Bus stops, taxi ranks and also schools are all areas where a larger number of vehicles often have their engines running for an unnecessarily long period of time.

The Council will encourage drivers of idling vehicles to switch their engine through an awareness campaign.

2.10.13 Promoting alternative modes of transport/emissions

The London Borough of Bromley has localised exceedences of nitrogen dioxide specifically at road junctions that suffer sporadic congestion at certain times of the day. Not surprisingly these peak times of traffic flow mirror the school and work run. Outside of these hours there is very little congestion within the borough with traffic flowing relatively well. The slight exceedences of the annual mean objective for nitrogen dioxide are a product of these more congested times and it is reasonable to suppose any reduction in the number of vehicles on the roads during these times will go a significant way in bringing the levels of nitrogen dioxide down, possibly below the government targets.

Travel plans are packages of workplace or school based measures aimed at reducing vehicle trips by promoting cleaner, more sustainable travel choices. A successful travel plan will influence travel behaviour and encourage a modal shift towards walking, cycling and public transport. The immediate benefit of these modal shifts to the environment is fewer car journeys that clearly lead to a reduction in congestion, pollution, noise and stress.

Below are just some of the benefits to the school and workplace:

I) Workplace

- cost savings from reduced fuel consumption and reduced vehicle use;
- reduced accident and insurance costs and improved personal safety from safer driving;
- reduced travelling time to work = increased productivity time;
- reduced stress from traffic congestion;
- reduced demand for on-site parking – land can be used for more productive purposes;
- greater choice for staff to get to work – leads to improved morale and ability to fill vacancies and help retain staff;
- benefits staff that do not receive company cars/allowances.

II) School

- improved health and safety of pupils – traffic pollution aggravates child asthma and pollution levels are up to 3 times higher inside a car than outside in the street
- reduced traffic inside and outside school;
- improved relations with the school's neighbours;
- involvement in a wider community-based project;
- an improved school environment;
- opportunities for learning, particularly under the theme of citizenship and environment; and
- visits from outside professionals.

2.10.13.1 Workplace Travel Plans - Bromley Council

Proposal 25. The Air Quality Officer and Pollution Team will continue to support the LBBWTP and as appropriate provide air quality data and expertise to maximize the potential improvements to air quality.

Bromley's Workplace Travel Plan is a short, medium and long term travel management strategy which seeks to deliver sustainable objectives through a detailed annual action plan. Bromley Council was awarded £20,000 from TfL(Transport for London) in 2006/07 to implement a Staff Travel Plan, which has been spent on improvements already. Ongoing support of the Travel Plan will be resourced in house with the help of existing officers, meaning that it will be sustainable and self financing, as well as contributing to reduce accommodation and staffing costs through more efficient use of existing resources.

It is essential that the needs of the staff are reflected in the Travel Plan, especially for an organisation the size of Bromley Council, which employs 2190 staff (non inclusive of teaching staff who are covered under School Travel Plans) across 39 council sites in Bromley. The majority of Bromley Council staff are located in the Civic Centre therefore the Workplace Travel Plan is focused on, but not restricted to, the Civic Centre.

The objectives of the Bromley Workplace Travel Plan are:

- For business and operational needs of the Council to set an example, and promote good practice to all staff, other local employers, schools and the community;
- to reduce congestion at peak times;
- to increase walking and cycling, car sharing and public transport
- usage; and
- to improve air quality as a result of reduced traffic movements.

The Table 2 summarises the targets that have been set by the London Borough of Bromley Travel Plan in relation to its own staff.

Table 2 London Borough of Bromley Travel Plan targets for staff.

Mode	Modal Share		
	Staff Travel Survey 1998	Staff Travel Survey 2007	2010 Target
Bicycle	1.9%	1.5%	4%
Bus	11.9%	12.74%	14%
Car Driver	69.2%	61.5%	55%
Car Passenger	4.9%	2.61%	5%
Motorcycle	0.0%	0.7%	1%
Train	5.9%	5.32%	8%
Walk	6.2%	9.53%	13%

Bromley will continue to review and revise its existing staff travel plan , which dates from 2000, full implementation of measures will be adopted until 2008/2009.

2.10.13.2 School travel plans

Proposal 26. The Council will develop strong links with the school travel plan coordinator to help identify and target those schools that due to their proximity to the more congested junctions have a proportionally greater impact on the quality of air

Proposal 27. The Council will continue to provide and collect additional air quality data to assist in the identification of problematic junctions adjacent to large employers and schools.

Proposal 28. The Council will support and help promote the numerous initiatives as outlined in Bromley LIPS 2007 such as Bike Week, Walk to School Weeks, EU mobility week and the London Wide "Good going" campaign.

Proposal 29. The Council will seek funding to implement an air quality awareness campaign at local schools that will dovetail with current schemes such as WOW (Walk on Wednesdays, Bike week, Don't stop to drop).

There are 114 schools in Bromley with a combined pupil population of almost 50,000 children; furthermore the 2001 LATS survey shows that almost 43% of children are taken to school by car. A survey carried out by Bromley council in 2003 showed that 26% of secondary school children and 56% of primary school children travelled to school by car.

There are 114 schools in Bromley (77 primary, 18 secondary, 14 independent, 5 SEN) the Council is using travel plans to assess each school and implement walking, cycling and car sharing schemes in order to reduce the number of vehicles on the road around these schools. These initiatives will ultimately have a direct impact on the quality of air as traffic is taken off the roads and as such the success and uptake of such initiatives are key to the success of any air quality action plan.

Bromley has been implementing these changes to schools around the borough over the last five years and currently has achieved;

- Safer routes to school improvement programmes at 35 schools
- Approved school travel plans in place at 66 schools
- 34 Walking Bus routes in place, with over 300 children participating

In the Dfes and DfT publication “Travelling to school: An action plan” the government set out national targets to have school travel plans at 6,000 schools by March 2005 and 10,000 by 2010. The Mayors local implementation plan set more ambitious targets with aim for all schools to have a travel plan in place by 2009. Bromley is currently on target to meet these targets and with continued funding all 114 schools will meet this 2009 target.

Figure 10 Modal split for primary schools with or working towards a travel plan - May 2006

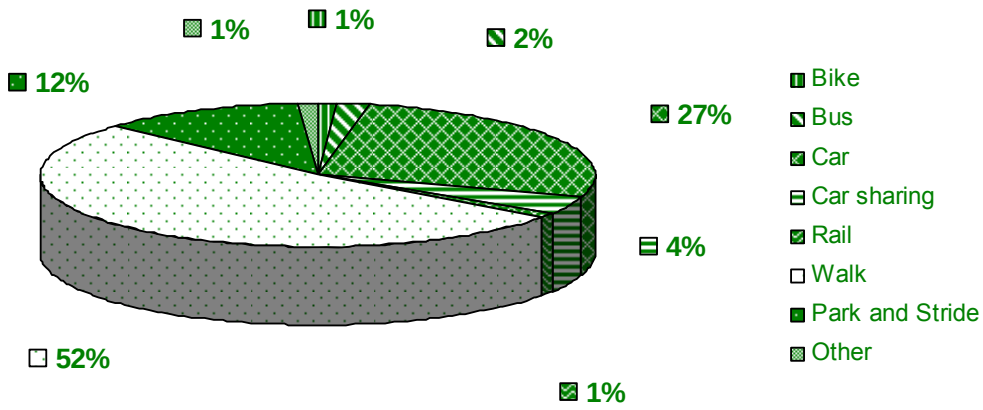
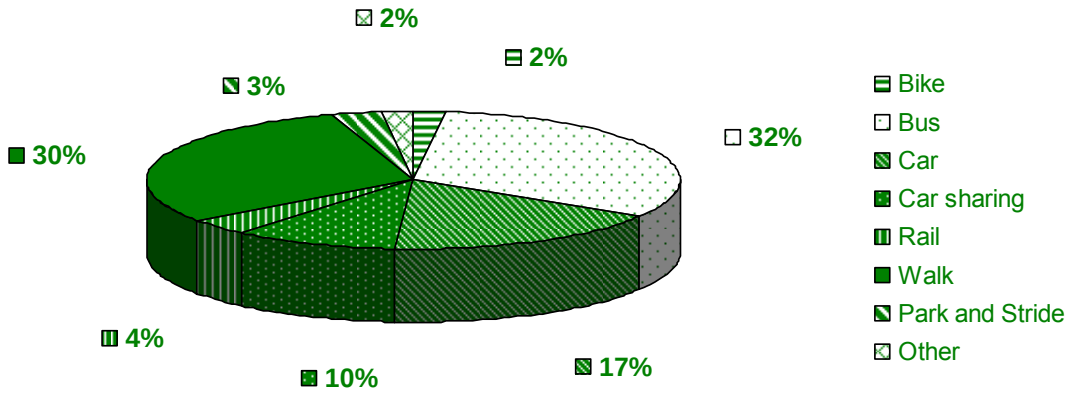


Figure 11 Modal split for secondary schools with or working towards a school travel plan - May 2006

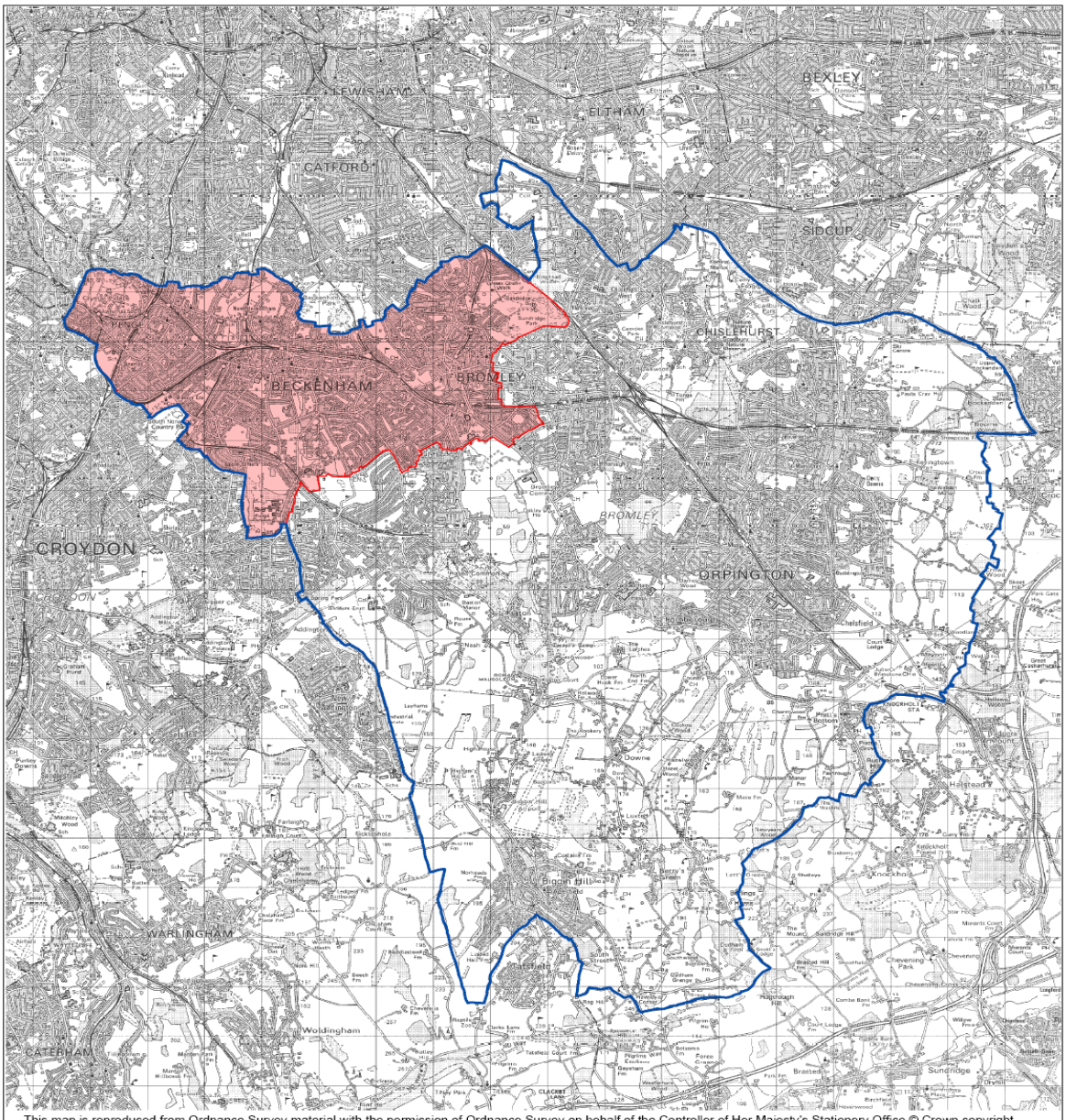


Appendices

Appendix 1 Expert Panel on Air Quality Standards (EPAQS)

Pollutant	Objective Concentration		Date to be achieved by
Benzene	16.25µg/m^3 (5ppb)	running annual mean	
	5mg/m3 (1.5ppb)	annual mean	1 January 2010
1,3-Butadiene	2.25µg/m^3 (1ppb)	running annual mean	31 December 2003
Carbon monoxide	10mg/m^3 (8.6ppm)	running 8 hour mean	1 January 2005
Lead	0.5µg/m^3	annual mean	31 December 2004
	0.25µg/m^3	annual mean	31 December 2008
Nitrogen dioxide[b]	200µg/m^3 (105ppb) not to be exceeded more than 18 times a year	1 hour mean	1 January 2010
	40µg/m^3 (21ppb)	annual mean	1 January 2010
Particles (PM10)	50µg/m^3 not to be exceeded more than 35 times a year	24 hour mean	1 January 2005
	40µg/m^3	annual mean	1 January 2005
Particles PM$^{2.5}$	25 µg/m^3	Annual mean	2020
Exposure reduction (urban areas)	Target of 15% reduction in concentration at urban background		Between 2010 and 2020
Sulphur dioxide	350µg/m^3 (132ppb) not to be exceeded more than 24 times a year	1 hour mean	31 December 2004
	125µg/m^3 (47ppb) not to be exceeded more than 3 times a year	24 hour mean	31 December 2004
	266µg/m^3 (100ppb) not to be exceeded more than 35 times a year	15 minute mean	31 December 2005

Appendix 2 Air Quality Management Area



ENVIRONMENT AND LEISURE SERVICES

AIR QUALITY MANAGEMENT AREA

Bromley
THE LONDON BOROUGH

GORDON HAYWARD
DIRECTOR OF ENVIRONMENT AND LEISURE SERVICES,
BROMLEY CIVIC CENTRE,
STOCKWELL CLOSE,
BROMLEY,
BR1 3UH.
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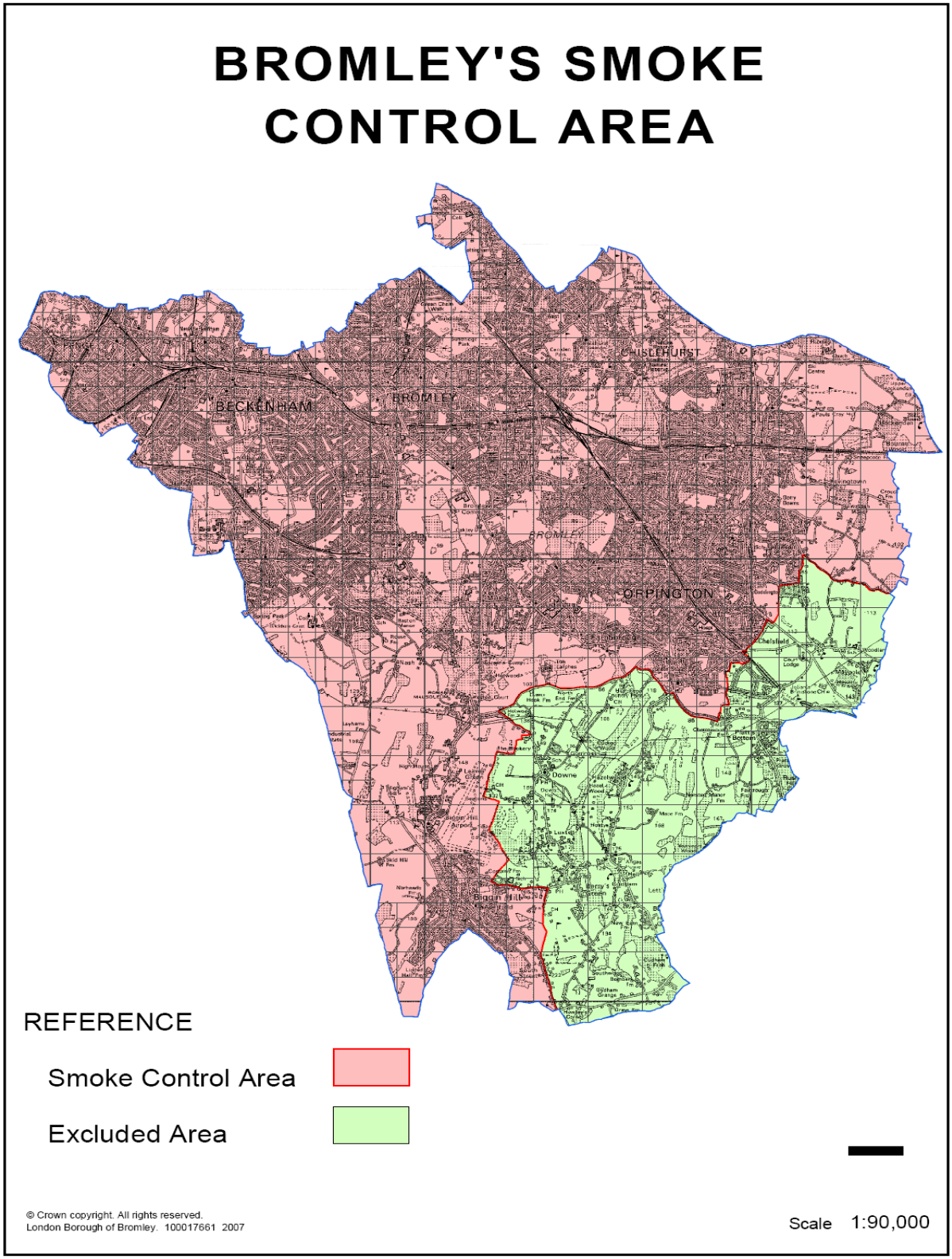
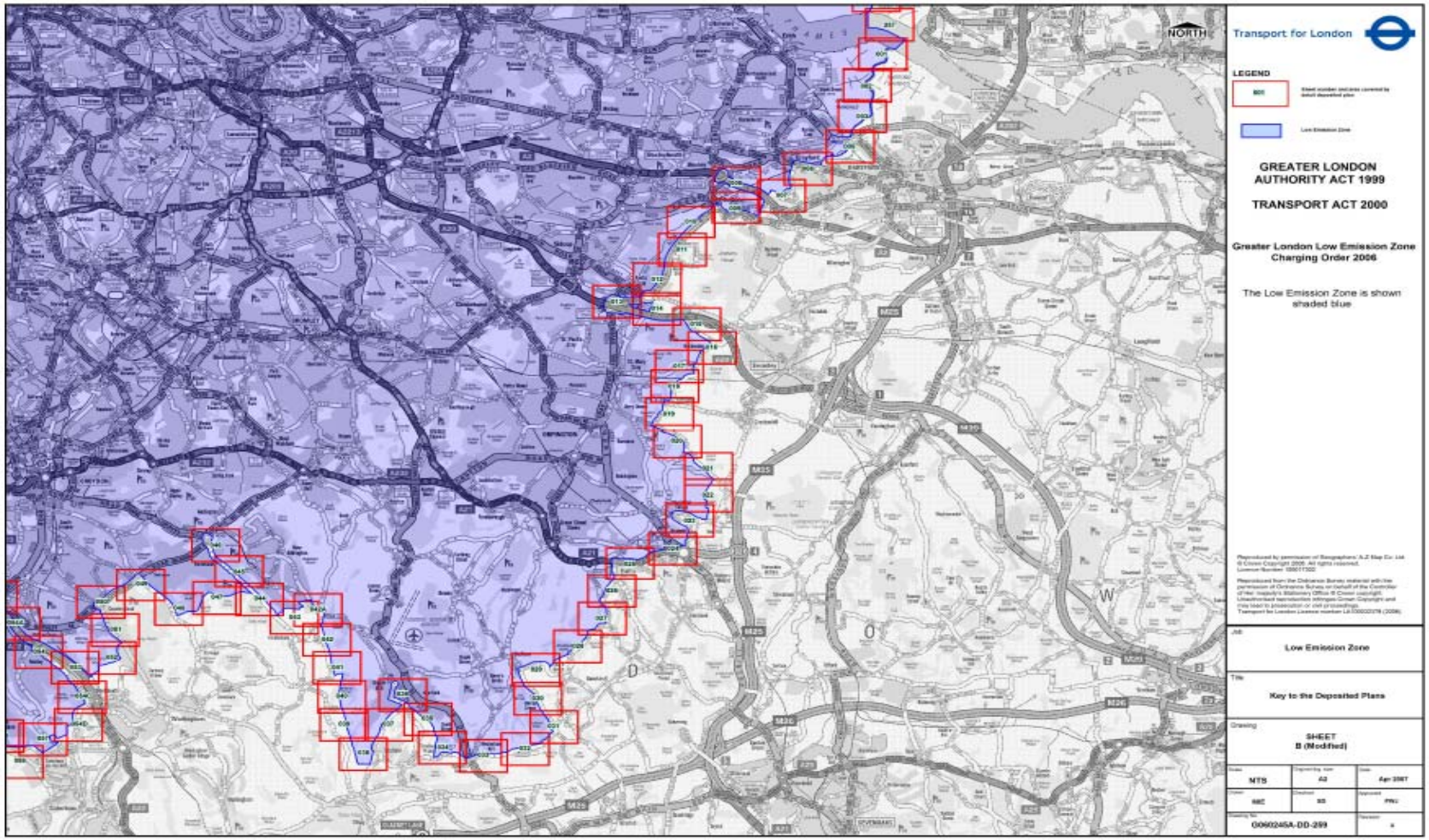
Scale 1:68,379	±	16/03/07	Plan No.

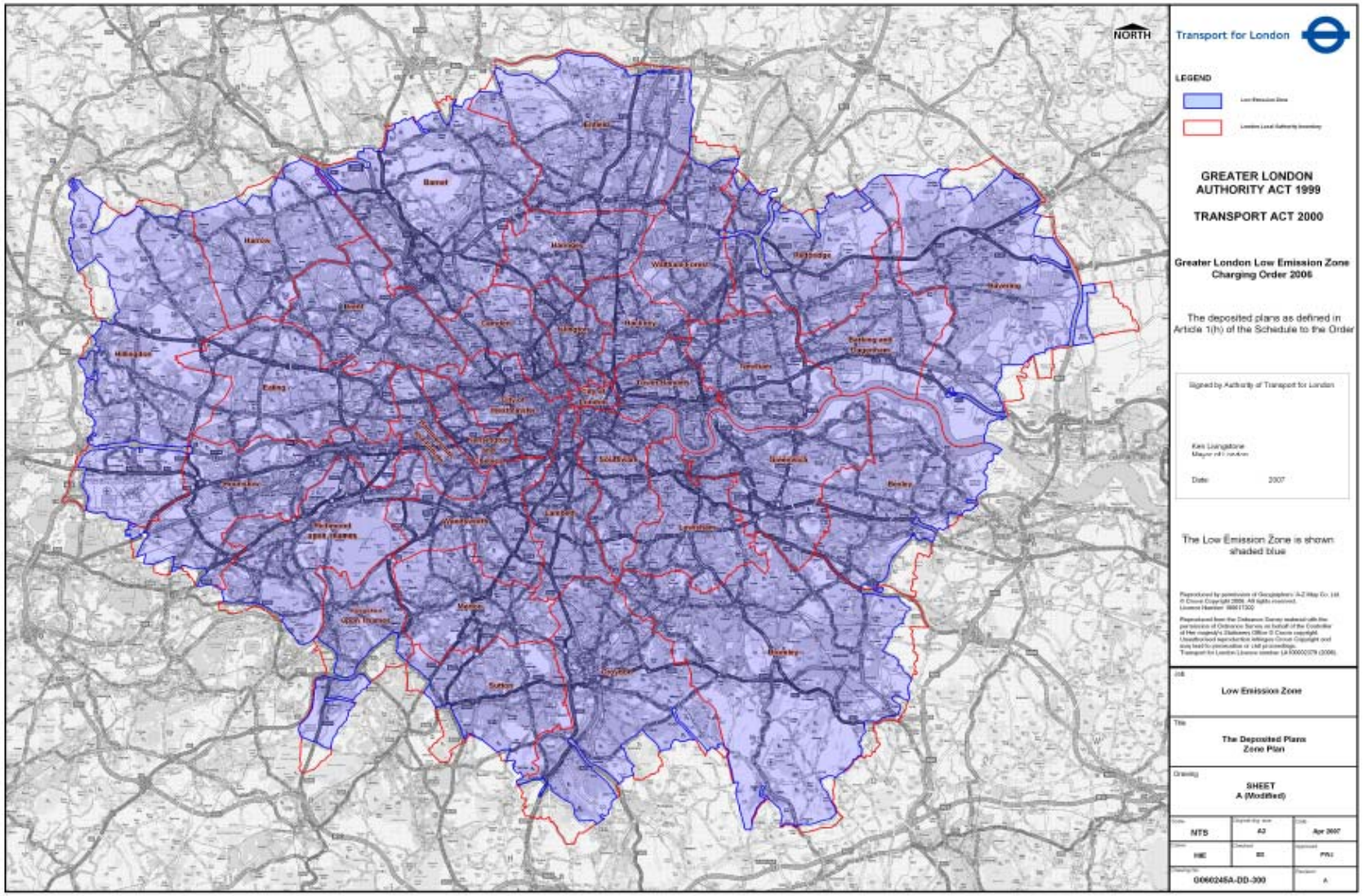
Appendix 3 Bromley's Smoke Control Area





Appendix 4a Low Emission Zone

Appendix 4b Low Emission Zone



Appendix 5 Organisations formally contacted during consultation

The following organisations were invited to submit their comments on this action plan as part of the wider public consultation.

Bromley Primary Care Trust
Dartford Borough Council
London Borough of Bexley
London Borough of Croydon
London Borough of Greenwich
London Borough of Lambeth
London Borough of Lewisham
London Borough of Southwark
Sevenoaks District Council
Tandridge District Council
The Environment Agency
The elected members of the London Borough of Bromley
The mayor of London
The Secretary of State for the Environment, Food and Rural Affairs (DEFRA)

Appendix 6 Costs and Benefits

Action/ Proposal	Other partner/ agencies involved	Start date	End date	Annual average cost to the council Low (<£10,000) Medium (£10 - £15,000) High (>£15,000)	Air quality benefit Low(<0.5µg/m^3) Medium (0.5 to 1 µg/m^3) High(>1 µg/m^3) For PM10 & N02 (either individually or combined)	Source of funding & comment
Non-Local implementation Plan related initiatives						
.Work with contractors and developers to encourage them to adopt the 'Best Practice Guidance' to control dust and emissions from construction and demolition and take every step possible to minimise dust emissions.	LBB Planning department, developers and contractors.	Immediate	2010	Low	For $N0_2$: Low For PM^{10}: Med	Will also benefit noise as older noisier plant is replaced with quieter technology
The Council will resist development that is likely to cause air quality objectives to be breached, particularly within designated Air Quality Management Areas (AQMAs)	LBB Planning department, environmental portfolio holder.	Immediate	2010	Low	Low	N/A
The Council will encourage the use of the Mayors Sustainable Design and Construction Supplementary Planning Guidance.	LBB Planning department, environmental portfolio holder.	Immediate	2010	Low	Low	N/A
The council will support and investigate the case for promoting a restriction on bonfires based on area and time of day	London Councils, AQ cluster group members	Immediate	2010	Low	Low	N/A

Action/ Proposal	Other partner/ agencies involved	Start date	End date	Annual average cost to the council Low (<£10,000) Medium (£10 - £15,000) High (>£15,000)	Air quality benefit Low(<0.5µg/m^3) Medium (0.5 to 1 µg/m^3) High(˃1 µg/m^3) For PM10 & N02 (either individually or combined)	Source of funding & comment
The Council will continue to ensure that emissions from all 'prescribed processes' remain controlled and regulated in line with national policy and conditions of issued permits.	DEFRA, Environment Agency	Immediate	On going	Low	Low	DEFRA
The council will ensure all new installations are bought into the relevant regime and existing installations are kept informed of new legislative requirements under the Pollution Prevention and Control Act 1999.	DEFRA, LBB Planning department	Immediate	On going	Low	Low	DEFRA
The council will continue to inform residents of the smoke control areas and where necessary take enforcement action if un authorized fuels are burned or unauthorized appliances used.	N/A	Immediate	Ongoing	Low	Low	N/A
Promote energy efficiency and sustainability on new developments by supporting the council sustainability and energy efficiency policy through the planning process.	LBB Planning department and sustainability officer.	Immediate	Ongoing	Low	Low	Will also have benefits relating to climate change and C02 emissions.

Action/ Proposal	Other partner/ agencies involved	Start date	End date	Annual average cost to the council Low (<£10,000) Medium (£10 - £15,000) High (>£15,000)	Air quality benefit Low(<0.5µg/m^3) Medium (0.5 to 1 µg/m^3) High(˃1 µg/m^3) For PM10 & N02 (either individually or combined)	Source of funding & comment
Where possible the council will encourage through the planning process developers or new business premises to use low NOx burners or other cleaner fuels including the Sulphur Content of Liquid Fuels (England and Wales) Regulations 2007*	LBB Planning department, developers and contractors.	Immediate	Ongoing	Low	Low	Will also have benefits relating to climate change and C02 emissions.
Continue to monitor air quality in Bromley, particularly pollutants of concern such as Nitrogen Dioxide and PM10	ERG	Immediate	Ongoing	Low	Low	
Find new ways to improve publicity of pollution data and its availability to the public through at least two methods, such as through public display boards and or the Bromley website.		Immediate	Ongoing	Low	Low	
Develop the London Borough of Bromley website to include real time air quality monitoring data.		2008	2009	Low	Low	

Action/ Proposal	Other partner/ agencies involved	Start date	End date	Annual average cost to the council Low (<£10,000) Medium (£10 - £15,000) High (>£15,000)	Air quality benefit Low(<0.5µg/m^3) Medium (0.5 to 1 µg/m^3) High(˃1 µg/m^3) For PM10 & N02 (either individually or combined)	Source of funding & comment
Continue to work with neighbouring boroughs including cluster and working groups on current issues tackling technical and policy issues		Immediate	Ongoing	Low	Low	
Local implementation Plan related initiatives						
Provide any data or monitoring services to target problematic junctions in order to improve the movement of council vehicles	LBB transport department, fleet management	Immediate	Ongoing	Low	Low	
We will continue to support the London LEZ, work with other boroughs and industry to support its introduction and ensure our vehicle fleet vehicles comply with requirements of the zone with the caveat that no additional cost would fall on the Bromley taxpayers as a result of the LEZ.	Greater London Authority Transport for London London Councils London Boroughs	Feb 2008	Ongoing	Low	For N0^2: Low For PM^{10}: Med	Will also have benefits relating to C02 emissions and possible noise as older plant noisier engines are replaced with newer quieter technology.
We will play an active role in the further development and adoption of the SLFQP including	Transport for London Other boroughs in South London Private sector	Existing scheme	2010	Low	For PM^{10}: High For N0^2: Low	Will also have benefits relating to C02 emissions and possible noise as older plant

Action/ Proposal	Other partner/ agencies involved	Start date	End date	Annual average cost to the council Low (<£10,000) Medium (£10 - £15,000) High (>£15,000)	Air quality benefit Low(<0.5µg/m^3) Medium (0.5 to 1 µg/m^3) High(˃1 µg/m^3) For PM10 & N02 (either individually or combined)	Source of funding & comment
among other initiative trialing of night time deliveries, loading bay optimization and feasilbity studies of consolidation centres	and trade associations					noisier engines are replaced with newer quieter technology.
The Air quality officer and pollution team as a whole will fully support the LBBWTP and where appropriate provide air quality data and expertise to maximize the potential improvements to air quality	LBB Travel plan officers	Immediate	2009	Low	Low	
Develop closer ties with the school travel plan coordinator to help identify and target those schools that due to their proximity to the more congested junctions have a proportionally greater impact on the quality of air	LBB School travel plan coordinator	Immediate	2009	Low	Low	
Continue to provide and collect additional air quality data to assist in the identification of problematic junctions adjacent to large employers and schools.		Immediate	2010	Low	Low	
Support and help promote the numerous initiatives as outlined in Bromley LIPS 2007 such as Bike Week, Walk to	LBB Transport department	Immediate	Ongoing	Low	Low	

Action/ Proposal	Other partner/ agencies involved	Start date	End date	Annual average cost to the council Low (<£10,000) Medium (£10 - £15,000) High (>£15,000)	Air quality benefit Low(<0.5µg/m^3) Medium (0.5 to 1 µg/m^3) High(˃1 µg/m^3) For PM10 & N02 (either individually or combined)	Source of funding & comment
School Weeks, EU mobility week and the London Wide "Good going" campaign						
We will seek funding to implement an air quality awareness campaign at local schools that will dovetail with current schemes such as WOW (Walk on Wednesdays, Bike week, Don't stop to drop).	LBB School travel plan coordinator	2009	2010	Low	Low	Apply for DEFRA funds to contract a performance arts company to deliver an educational campaign to primary/second ary schools
The council will introduce cost accounting and risk based assessments in order to identify the more potentially polluting installations within LBB.		Immediate	2009	Low	Low	
Tfl and LBB will identify the major congestion bottlenecks	TFL	Immediate	2009	Low	Low	LBB awaiting TFL responses to proposed traffic schemes
Identification of sections of A roads and busy bus routes network to review with TFL. Survey of the significant routes in Bromley and identification of pinch points. Prioritisation of these areas to improve traffic flow.	TFL	Immediate	2009	Low	Low	

Action/ Proposal	Other partner/ agencies involved	Start date	End date	Annual average cost to the council Low (<£10,000) Medium (£10 - £15,000) High (>£15,000)	Air quality benefit Low(<0.5µg/m^3) Medium (0.5 to 1 µg/m^3) High(˃1 µg/m^3) For PM10 & N02 (either individually or combined)	Source of funding & comment
Real time traffic information introduction of real time car parking information, using variable message direction signs. For Bromley two centre as part of the Area Action Plan	LBB Transport department	2009	Ongoing	High	Low	
Pedestrian phases at traffic signals - A full survey of these crossings to determine suitability to introduce crossing and assist pedestrian movement while minimising restriction of traffic flow.	LBB Transport department	2008	2009	Low	Low	
Less polluting vehicles – investigate methods of providing discounts in permit charges for vehicles of less than 1100cc, gas, electric or hybrid.	LBB Transport department LBB Parking services	Immediate	2009	Low	Low	
The council will reduce pollution from unnecessarily idling vehicles through the introduction of fixed penalty notices.	Council Parking Services	2008	2010	Low	Low	
The Council will improve signage at bus stops and taxi ranks and other idling hotspots such as schools to discourage unnecessary idling of vehicles	LBB Transport department	2009	Ongoing	Low	Low	

Appendix 7 NOx Tube Sites

Site Ref	Site Name	OS Grid References X	Y
Area 1	Elmers End	536073	168434
Area 3	Becekenham Lane	539557	169448
Area 4	London Road/Hope Park	539786	170050
Area 5	Widmore Road	540518	169405
Area 6	Burnt Ash Lane	540326	170247
Area 13	Bromley Common	541039	168228
Area 14	Anerley Hill	535042	169557
Area 15	Anerley Road	533949	170622
Area 16	Beckenham Road	535944	169766
Area 17	Harwood Avenue AQ Site	540519	169324

Notes:

Area 1, Elmers End

The modelling covered Elmers End Road from Birkbeck station to the junction with Croydon Road and Croydon Road from this junction to its junction with Cromwell Road. The modelling predicts that nitrogen dioxide concentrations in exceedence of the 40 $\mu gm^{-3}$are probable at properties on Elmers End Road between Arrol Road and Blandford Road, and at the majority of properties along Croydon Road in 2007 according to the criteria in Table 13.

Exceedences are predicted to be possible at all other properties along Elmers End Road and Croydon Road. By 2010, the contour plots show that exceedences are possible at the majority of properties along Elmers End Road and Croydon Road, with a few properties on Croydon Road predicted to probably exceed the annual mean NO2 objective. These are located between Eden Park Road and Elmers End Green. It should however be noted that the contour plots represent concentrations at 1.5 m. Many of the properties on this stretch of road are used for commercial purposes on the ground floor where the objective does not apply.

Area 3, Bromley Road / Beckenham Lane, Shortlands

The modelling covered Bromley Road East of the junction with Scotts Avenue and Beckenham Lane up to the junction with London Road. The contour plots show that exceedences of the annual mean NO2 objective are possible at many properties along this stretch of road in 2007 as concentrations are predicted to be in excess of 36 µg/m3 at façades. However, by 2010 exceedences of the objective are predicted to be unlikely, according to the criteria in Table 13.

Area 4, London Road, Bromley

The modelling covers the stretch of London Road from Park Avenue to Tweedy Road. The contour plots indicate that exceedences of the annual mean NO2 objective are probable at properties between Warner Road and Hope Park in 2007, and possible at all other facades along London Road. The 2010 contour plots indicate that exceedences are unlikely along London Road in 2010 at all façades

Area 5, Widmore Road / Kentish Way, Bromley

The modelling focused on the junction of Widmore Road and Kentish Way, for which traffic data were provided. The contour plots indicate that exceedences are likely in 2007 at several properties around the junction, probable at a few properties, and possible at the remainder of the properties along Kentish Way and Widmore Road and at several properties on Harwood Avenue. The plots indicate that by 2010 exceedences are likely at a few properties close to the junction and probable at a few others. The remainder of the properties along Widmore Road are unlikely to exceed the objective in 2010.

Area 6, Burnt Ash Lane / College Road, Sundridge

The modelling covered Burnt Ash Lane as far north as Lake Avenue and College Road as far south as Morgan Avenue. The 2007 contour plot indicates that exceedences of the annual mean NO2 objective are possible at the majority of façades along Burnt Ash Lane, and possible at the majority of façades on College Road. The 2010 contour plot indicates that exceedences are unlikely along both roads at all façades.

Area 13, Masons Hill / Bromley Common, Bromley

The modelling covered Masons Hill south of the junction with Kentish Way and Bromley Common as far south as the junction with Oakley Road. The 2007 contour plot indicates that exceedences are probable at a couple of façades but possible at the majority of façades along Masons Hill, but unlikely at the façades along Bromley Common. The 2010 contour plot indicates that exceedences are possible at a few properties on Masons Hill but unlikely at the majority of façades along both roads.

Area 14, Anerley Hill, Crystal Palace

The modelling focused on a stretch of Anerley Hill close to the junction with Cintra Park. The 2007 contour plot indicates that exceedences of the annual mean objective are probable at properties located on the north side of the road and possible at properties on the southern side. The 2010 contour plot indicates that exceedences are possible at properties on the north side, but unlikely at properties on the south side of Anerley Hill.

Area 15, Penge Road / Anerley Road, Anerley

The modelling focused on the junction of Penge Road with Croydon Road, Anerley Road and Elmers End Road and Penge Road itself. The 2007 contour plot indicates that exceedences of the annual mean are likely at a couple of properties close to the junction, probable at the majority of the properties close to the junction and on the south side of Penge Road, and possible at the majority of properties on the north side of Penge Road. The 2010 contour plots indicate that exceedences are probable at a couple of properties close to the junction, and possible at the majority of the receptors around the junction. Receptors further along Penge Road are unlikely to exceed the annual mean objective in 2010.

Area 16, Crystal Palace Park Road

The modelling focussed on the junction of High Street with Croydon Road and Green Lane. The contour plots indicate that exceedences of the NO2 annual mean objective are likely at receptors very close to the junction in 2007, with the majority of properties probably exceeding the objective, and the remainder possibly exceeding. In 2010, a couple of properties are probably to exceed the annual mean objective at locations very close to the junction, the majority of properties along the four roads will possibly exceed the objective.

Appendix 8 Glossary of terms

Abbreviation Full name

AQMA Air Quality Management Area
AQS Air Quality Strategy
BAT Best Available Technology
BHAL Biggin Hill Airport Limited
CHP Combined heat and power
DEFRA Department for Environment, Food and Rural Affairs
DETR Department for Transport and Regions
DOE Department of the Environment
EPAQS Expert Panel on Air Quality Standards
EPUK Environmental Protection UK
GLA Greater London Authority
HDV Heavy Duty Vehicles
HGV Heavy Goods vehicles
KCC Kent County Council
LAEI London Atmospheric Emission Inventory
LAQM Local Air Quality Management
LBB London Borough of Bromley
LDD Local Development Documents
LDF Local Development Framework
LDV Light Duty Vehicles
LEZ Low Emission Zone
LIP Local implementation plan
LSP Local Strategic Partnership
LTP Local Transport Plan
NAQS National Air Quality Strategy
NO_2 Nitrogen dioxide
NOx Oxides of nitrogen
NSCA National Society for Clean Air
PM_{10} Fine particle matter less than 10µm diameter
ppb Parts per billion
SO_2 Sulphur dioxide
TFL Transport for London
TLRN Transport for London Road Network
UDP Unitary Development Plan
μgm^{-3} Micrograms per cubic metre
UTMC Urban Traffic Management Control
VMS Variable Message Signage