

Air Quality Action Plan

Acknowledgements

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Executive Summary

Air quality assessments undertaken by Enfield Council identified that the Government's air quality objective for annual mean nitrogen dioxide and daily mean PM_{10} were not been met by the specified dates. As a consequence the Council designated an Air Quality Management Area (AQMA) across the whole of the Borough and produced an Air Quality Action Plan in recognition of the legal requirement on the Council to work towards air quality objectives within the Borough; this is as required under Part IV of the Environment Act 1995 and the relevant air quality regulations.

This document revises the Council's first Air Quality Action Plan, updating and detailing the measures that Enfield Council and its partners are taking, intending and considering that will help to improve air quality and fulfil its statutory duties.

Most of the air pollution in the Enfield AQMA is caused by road traffic. The Air Quality Action Plan reflects this by including measures to reduce the pollution emitted from vehicles on the roads. Enfield Council is also addressing emissions from non-road sources such as industrial, commercial and domestic activities for the area declared.

The Air Quality Action Plan is a working document that should stimulate new ideas and transform existing policies to improve air quality across the Council and beyond.

Widespread and continuing consultation and participation are essential, both within the Council and externally with relevant stakeholders and the public. An effective Action Plan, that will achieve its targets, is one that has gained Member and Corporate commitment and support.

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1. Introduction to the Enfield Air Quality Action Plan

1.1 Overview

This is the revised Air Quality Action Plan for Enfield Council (the "Council") that will help to improve air quality and work towards the achievement of the Government's air quality objectives in the designated Air Quality Management Area across the Borough. The Air Quality Action Plan includes details of existing initiatives as well as proposed measures and their implementation.

The Air Quality Action Plan is a statutory requirement and part of the Council's continuing Local Air Quality Management responsibilities under Part IV of the Environment Act 1995. The Council is seeking to produce the Action Plan in partnership with other stakeholder organisations and for that purpose is working closely with other agencies. The purpose of the Action Plan, as required by section 84 of the Environment Act, is to outline measures "in pursuit of the achievement of air quality standards and objectives in the designated area, of any powers exercisable by the authority".

1.2 Background

1.2.1 Effects of air quality in the UK

Air pollution affects the quality of air that we breathe and although air quality has improved in the UK in recent decades, evidence shows that invisible pollutants in the present day can still significantly harm human health and the environment. Exposure to poor air quality can have a long-term effect on health; this is associated with premature mortality due to cardiopulmonary (heart and lung) effects. In the shorter-term, high pollution episodes can trigger increased admissions to hospital and contribute to the premature death of those people that are more vulnerable to daily changes in levels of air pollutants. Air pollution can also have negative impacts on our environment, both in terms of direct effects of pollutants on vegetation, and indirectly through effects on the acid and nutrient status of soils and waters.

Recent estimates indicate that poor air quality reduces the life expectancy of everyone in the UK by an average of seven to eight months. The House of Commons Environmental Audit Committee (EAC) further noted that the impact of air quality on life expectancy is considered greater than that from both road traffic accidents and passive smoking (EAC, 2010). The EAC also, more recently, in calling for more government action stated that "Four thousand people died as a result of the Great Smog of London in 1952 and this led to the introduction of the Clean Air Act in 1956. In 2008, 4,000 people died in London from air pollution and 30,000 died across the whole of the UK" (EAC, 2011).

1.2.2 U.K Government's Air Quality objectives

Part IV of the Environment Act 1995 introduced new responsibilities to both national and local government throughout the UK. These responsibilities include the requirement upon the national government and devolved administrations to develop an Air Quality Strategy (AQS) for England, Wales, Scotland and Northern Ireland. The overall purpose of the AQS is to seek improvements in air quality for the benefit of public health. The first AQS was produced in 1997; it was amended in 2000 and the most recent version was produced in 2007 (Defra, 2007).

Local air quality management (LAQM) was also introduced by the Environment Act 1995. It requires local authorities to periodically review and assess air quality across their areas. The AQS confirms that LAQM provides a major component of the government's plan for air quality improvement across the UK.

Air quality objectives have been set for those air pollutants deemed to be of most concern and seven of these are included under the LAQM regime. A summary of these pollutants and the air quality objectives is given in Appendix 1. The objectives are all based on health-based standards using scientific advice, taking into account the likely cost and benefits, as well as feasibility and practicality in meeting the objectives. The objectives are mostly in line with the limit values prescribed by EU Directives, although additional objectives (including bringing forward the date for compliance) have been included for some pollutants. (Note – the responsibility for meeting the EU limit values falls on the UK government).

1.2.3 Enfield Council position

The LAQM process requires a phased approach over the period from 1999 to 2017, during which a local authority is required to undertake separate rounds of the review and assessment of air quality in its area. All local authorities are required to undertake Updating and Screening Assessments (USA). These start every new round of review and assessment, beginning in the following years: 2003, 2006, 2009, 2012 and 2015. The purpose of the USA is to ensure that each local authority undertakes a level of assessment that is commensurate with the risk of an air quality objective being exceeded. The process also requires a Detailed Assessment to determine whether an Air Quality Management Area (AQMA) is needed. If an AQMA is designated, the Council must undertake a Further Assessment of air quality and produce an Air Quality Action Plan.

The Council has assessed and screened: benzene, 1,3 butadiene, carbon monoxide, lead and sulphur dioxide in its regular Updating and Screening Assessments and found that these pollutants were not likely to exceed to the air quality objectives in the Borough (see Table 7).

However for nitrogen dioxide (NO₂) and particulate matter (PM₁₀) the Council undertook a Detailed Assessments. These showed that the annual mean objective of 40 μ g m⁻³ for NO₂ and daily mean objective of 50 μ g m⁻³ (not to be exceeded more than 35 days in one year) for PM₁₀ were exceeded in parts of the Borough. As a result the Council declared an AQMA across the Borough for these pollutants. The outcomes of updated assessments of both NO₂ and PM₁₀ are shown in the figures in section 1.5 below.

1.3 Action Plan requirements

The policy guidance, issued by Department of Environment, Food and Rural Affairs (Defra) i.e. LAQM. PG 09 (Defra, 2009), provides advice as to how the Council should develop its Air Quality Action Plan. The guidance indicates that a detailed description of actions, the dates by which these are to be achieved and information on how achievement is to be measured is an integral part of action planning. Where possible, Action Plans should include a quantified projected outcome with timescales for reporting against in subsequent progress reports. Furthermore the Part IV of the Environment Act also permits the Council from time to time to revise its Action Plan.

Importantly however, the guidance notes that it will often be the case that most measures in an Action Plan cannot be quantified. In these cases, qualitative information, along with any quantifiable information as far as is possible, is expected.

The Air Quality Action Plan must include the following:

• Quantification of the source contributions to the predicted exceedences of the relevant objectives; this will allow the Air Quality Action Plan measures to be effectively targeted.

• Evidence that all available options have been considered.

• How the Council will use its powers and also work in conjunction with other organisations in pursuit of the air quality objectives.

• Clear timescales in which the authority and other organisations and agencies propose to implement the measures within its plan.

Where possible, quantification of the expected impacts of the proposed measures and an indication as to whether the measures will be sufficient to meet the air quality objectives. Where feasible, data on emissions could be included as well as data on concentrations where possible.
How the Council intends to monitor and evaluate the effectiveness of the plan.

The Council is also required to consider the wider economic, social and environmental impact, bearing in mind other legal requirements and policy drivers.

1.4 Consultation on the draft Air Quality Action Plan

Consultation is an important part of the LAQM regime and the Council must consult appropriate agencies and organisations after developing options in the preparation of the Air Quality Action Plan. The following list includes those to be consulted:

- 1. Defra
- 2. Neighbouring local authorities;
- 3. Other public authorities as appropriate; and
- 4. Bodies representing local business interests and other organisations as appropriate (potentially including representatives of the public e.g. community councils).

The LAQM PG 09 guidance recommends that the consultation exercise should not last less than 8 to 12 weeks.

1.5 Summary description of the Enfield AQMA

The Enfield AQMA for nitrogen dioxide and PM_{10} is borough wide. The following figures indicate the most recent predictions of the NO₂ and PM_{10} objectives across the Borough (Bureau Veritas, 2009).

For NO_2 there are widespread exceedances of the annual mean objective along main roads in the Borough; these also include the main centres within the Borough, as well as the M25 sited at the northern of boundary.

For PM_{10} there are exceedances of the daily mean objective along parts of the busiest main roads in the Borough, including the M25, A406 North Circular Road and A10. The annual mean objective is exceeded in parts of the M25 and A406 North Circular Road only, very close to the centre of the roads.

The effect of changes to future concentrations is discussed in later chapters.



Figure 1 Predicted 2007 annual mean NO_2 concentrations in Enfield



Figure 2 Predicted 2007 annual mean PM_{10} concentrations in Enfield



Figure 3 Predicted 2007 daily mean PM_{10} concentrations in Enfield

2. Summary of the air quality review and assessment findings for Enfield

2.1 Enfield Further Review and Assessments

Having originally designated an AQMA in 2001, a further assessment of air quality for the AQMA was then undertaken. This further review and assessment of the Enfield AQMA helped to provide a technical justification for the measures contained in the subsequent Air Quality Action Plan and allowed the Council specifically:

- To confirm the original assessment of air quality and to show that the Council was right to declare the AQMA
- To calculate more accurately how much of an improvement in air quality will be required to deliver the air quality objectives within the AQMA
- To refine knowledge of the sources of air pollution so that the Enfield Air Quality Action Plan is properly targeted
- To take account of any developments in local or national policy which have occurred since the AQMA was declared, which were not factored into the earlier assessment work

This Air Quality Action Plan updates the previous work, incorporating more recent understanding based on improved knowledge and also recent monitoring and modelling reports for the Enfield area.

The most recent NO_2 monitoring reported in the Council's recent air quality reports (Enfield Air Quality Progress Report 2011) confirmed the earlier predictions and continued to show that the NO_2 annual mean objective is widely exceeded in the AQMA (see summary of monitoring results for the Enfield AQMA in Appendix 2). The PM_{10} predictions also highlight exceedances of the daily mean objective.

To better understand the improvement needed at a location to achieve the AQS objectives, it is necessary to determine the source emissions that contribute to the overall predicted pollution concentration. However both pollutant emissions and atmospheric processes, including meteorology, determine the pollution concentration at any given location. This is additionally complicated by the varying activities contributing to the sources of emissions.

For NO₂, the contribution from the different sources is understood by examining modelled predictions of oxides of nitrogen (NO_x) concentrations. This is because NO₂ is mostly a secondary pollutant, formed from NO_x as a result of chemical reactions in the atmosphere.

2.2 Understanding sources of pollution in the Enfield AQMA

For the original Further Assessment a series of locations were selected across the AQMA to help understand the source contribution of NO_x . These sites were chosen to provide a representative understanding of locations with predicted high concentrations of pollution.

The results also confirmed the importance of road traffic to air quality, with a typical contribution of around 60% NO_x from road transport and the other 40% from various background sources (such as domestic heating, commercial combustion, etc plus also road transport from beyond the local area). This total for road transport was based on the median result of the locations examined. With contributions from car and HGV sources greatly dominating in all locations. Of the background sources it was noted that almost 50% of this total was also from road transport.

For PM_{10} the assessment was made against annual mean concentrations at the same locations as used for the NO_x assessment. In this instance the background contribution greatly dominated even when compared with the all road transport total, although the most polluted locations were those most influenced by the contribution from road transport. The road sources were dominated by the HDV category (including buses and HGVs) for all locations.

The source apportionment has also been updated for this revised Air Quality Action Plan using a similar method to that described in the LAQM Technical Guidance TG 09 guidance. This suggests an initial separation into local sources along with both regional and local background contributions. It is

further split into vehicle types (vans/ HGVs, cars and buses). For this exercise the source apportionment has been based on two of the Council's roadside monitoring sites that exceeded the annual mean objective and were operating in 2010; namely Enfield 5 (Bowes Primary School) and 4 (Derby Road). These sites are both in the south of the Borough and therefore closer to central London.

The source apportionment reflects 2010 concentrations and is for NO_2 rather than NO_x . The mean values for the three sites are given in Figure 4.





The mean values for the source apportionment sites highlight the importance of the local background sources, representing around 50% of the total. This category refers to that component from the surrounding area of Enfield, as well as neighbouring parts of London. The regional component refers to the mainly rural contribution from outside of London. The local background component also includes a significant contribution from road transport as well as domestic sources, such as gas central heating, plus industrial sources. Of the categories of vehicle types examined, the contribution from vans and HGVs dominates, with another separate but large contribution from buses. The contribution from cars (both petrol and diesel) however is smaller. Although as discussed elsewhere in this Air Quality Action Plan, it should be noted that there are important concerns regarding the emission factors currently used.

Important points to note from this *indicative* source apportionment are:

- 1) The local NO₂ (comprising local vans/lorries/ cars and buses) i.e. from vehicles close to the monitoring site represent slightly less than 50% of the total.
- 2) The estimates for the local traffic <u>must</u> be considered indicative only in view of the current uncertainty surrounding emission factors. This includes the view that NO_x emissions especially from diesel cars are more significant than shown in the above estimations (this will become clearer when the new factors are released).
- 3) The local background also includes a significant proportion of emissions from road vehicles.

4) Local air quality management can (at best) only influence the local and local background components shown above.

2.3 Future forecasts of NO₂ in the Enfield AQMA

Updated guidance to TG 09 was released January 2010 to provide factors for determining when an AQS objective might be met. This guidance used revised adjustments to be applied to measurements made at roadside sites for future years. These factors were derived from nationally modelled data to represent "best" estimates, taking into account the future changes in traffic activity and the emission factors for NO_x and primary NO₂ for vehicles (both new and old).

The method predicted reductions in annual mean concentrations of NO₂ (and PM₁₀) year on year into the future (as did the previous guidance on future forecasts). This reflected both changes to vehicle flows and vehicle type (within the vehicle fleet) and the predicted reduction in background concentrations in the area over time. This predicted reduction into the future was based on forecasts, which included the uptake of new vehicles over time and the expected reductions in emissions as required by the agreed European emission standards. Thus the method, of necessity, included many assumptions and therefore it was idealistic.

Based on these forecasts, concentrations at many sites within the Enfield AQMA (and elsewhere) were predicted to meet the objectives in the coming few years. However these predictions are now considered as highly optimistic, since the factoring undertaken has not reflected reality.

This can be clearly seen from monitoring results undertaken within the Borough, as well as those from elsewhere. Figure 5 shows the LAQN annual mean index based on a selection of sites across London. This highlights that NO_x concentrations reduced from around the year 2000 to 2005, with only small changes since then. Annual mean NO_2 have also reduced, but to a lesser extent and since 2005 have hardly changed (King's College London, 2011).

These measured concentrations, particularly from London, are failing to fall in line with estimates and as a result the Department for the Environment, Food and Rural Affairs (Defra) commissioned research to investigate the issue. The results from this indicate that the predicted emission factors used are not realistic, leading to this over optimistic prediction of improvements in air quality (this is discussed further in chapter 4 of the Air Quality Action Plan).





2.4 Monitoring air quality

The monitoring of air quality in Enfield is crucial if well informed policy decisions are to be made on matters that could affect pollution levels in the air. The Council undertakes continuous monitoring at three fixed long-term sites in the Borough:

- Enfield 1 a suburban background site in Bush Hill Park towards the middle of the Borough (monitoring at this site commenced in June 1995).
- Enfield 4 a roadside site in Derby Road in Edmonton, towards the southeast of the Borough. This site has been operating since February 2000. The sample inlet is located 6m from the road and the site monitors NO₂ and PM₁₀ (by BAM).
- Enfield 5 a roadside site at Bowes Primary School in the southwest of the Borough (site opened in July 2004). The site monitors NO₂ and PM₁₀ (by FDMS).

Two other sites in the Borough were closed prior to 2008. These were a roadside site at Church Street in Enfield and a background site in Ponders End.

The above sites are also representative of relevant exposure. All the sites are part of the London Air Quality Network and therefore the standards of QA/QC are similar to those of the Government's AURN sites. Regular calibrations are carried out, with subsequent data ratification undertaken by the ERG at King's College London. In all cases the data are fully ratified unless reported otherwise. Further details of the sites can be found at <u>www.londonair.org.uk</u>

Figure 6 Enfield 5 monitoring site at Bowes Primary School (showing A406 in background)



The pollution levels measured at these stations and the biased adjusted results from the Council's NO_2 diffusion tubes network were used in all review and assessment work.

All Enfield's Air Quality Reports can be accessed on its website at: http://www.enfield.gov.uk/info/413/pollution_control-air_quality/333/pollution_control__air_quality

For historical air quality data in Enfield see the London Air Quality Network website at: http://www.londonair.org.uk/LondonAir/Default.aspx

It is worth noting that the monitoring establishes the concentration of the pollutant measured at the location where it is undertaken. This concentration is averaged over the period of time for the objective; in the case of annual mean concentrations it is the preceding calendar year. Thus the concentration is related to both the prevailing pollutant emission conditions and the prevailing meteorology for that previous calendar year. In both instances there can be changes between years and therefore there is inter annual variation between the sets of measurements for the same location.

This, for example, can mean that the measured concentration is higher in a subsequent year (as well as a previous year). As a result of this the objective can be achieved one year and not the next.

To take account of this inter annual variation some authorities have adopted an estimated margin of uncertainty (of 10%) with the objective. This in effect means that to meet the NO₂ objective an annual mean of 36 μ g m⁻³ (as opposed to 40 μ g m⁻³) must be achieved. A similar finding would be found using probabilistic methods.

3. Building upon existing plans for Enfield

3.1 Introduction

The actions that the Council can propose in an Air Quality Action Plan are clearly not in isolation to actions that are already being implemented by both the Council and other bodies, including the Mayor for London and Transport for London (TfL). These include measures that are important to Enfield and build upon the Mayor's Air Quality Strategy (GLA, 2010). Recent Mayor led measures include seeking to reduce PM_{10} emissions in parts of London (GLA, 2011).

This chapter sets out the context; including actions that Enfield Council is currently taking and intending to take to improve air quality in the Borough. The actions described include those taken by the Council on its own, and those taken in partnership with the local community, local businesses as well as other regional and national agencies.

The Action Plan seeks to be consistent and build on other actions such as the Enfield Strategy, Council Corporate Plan and the newly emerging Local Development Framework. Importantly it also seeks consistency with the Council's Local Implementation Plan (see chapter 4).

The Action Plan reflects that air pollution arises from a wide variety of sources including those relating to domestic, commercial and industrial activities, as well as road transport (which is the most pertinent for the purposes of this Action Plan). It also draws on all the measures that the Council is taking where air quality will benefit and also seeks to show how these actions have a wider significance. The wide range of strategies and measures provided is intended to highlight those that can improve air quality in the Borough and are complementary to this Air Quality Action Plan.

3.2 Enfield Council vision

As a Council, we stand for **Fairness for All, Growth and Sustainability and Strong Communities**. We are committed to tackling the inequalities present in the borough and to providing high quality services for all.

In our role as local leader, we will ensure that Enfield makes a strong recovery from the recession, and that growth, businesses and jobs are attracted to the area.

We will invest in and safeguard our children and young people, building strong, empowered communities, where vulnerable people are protected, and residents feel safe, are healthy and take responsibility for their local environment. We will regenerate our most deprived areas and promote sustainability.

This vision is spelt out further overleaf:

Our vision, aims and priorities

Our vision is to make Enfield a better place to live and work, delivering fairness for all, growth and sustainability and strong communities. Underpinning this commitment we have a number of priorities, the delivery of which will contribute to improving the quality of life for all residents in the borough.

1. Fairness for all

Fairness for all means meeting the needs of all residents in the borough, protecting vulnerable residents and providing fair and equal access to services and opportunities. Tackling the inequalities in the Borough is at the heart of what we want to achieve for Enfield.

Our priorities are to:

- Serve the whole borough fairly and tackle inequality
- Provide high quality, affordable and accessible services for all
- Enable young people to achieve their potential

2. Growth and sustainability

Like many areas of the country, Enfield has suffered during the recent recession. Unemployment has risen, and many of the problems already present within the borough have been exacerbated. Demonstrating that Enfield is open for business will ensure that the borough makes a strong and sustainable recovery from the recession.

Our priorities are:

- A clean, green and sustainable environment
- Bring growth, jobs and opportunity to the borough

3. Strong communities

Building strong, cohesive and resilient communities will be vital as Enfield continues to grow and change as a borough. We want Enfield to be a place where people feel proud to live, where people from all different backgrounds are welcomed and supported, where vulnerable people are protected, and where people take responsibility for their own lives and their communities.

Our priorities are to:

- Encourage active citizenship
- Listen to the needs of local people and be open and accountable
- Provide strong leadership to champion the needs of Enfield
- Work in partnership with others to ensure Enfield is a safe and healthy place to live

3.3 The Enfield Strategy

The Enfield Strategic Partnership (ESP) is the Local Strategic Partnership for the London Borough of Enfield. The Partnership brings together key public sector organisations, local businesses, community and voluntary groups to work collectively to improve the quality of life for local people.

The Sustainable Communities Strategy 'Enfield's Future' is an overarching strategy that describes the long-term vision developed by the ESP after consultation with local people and businesses. The Council strategy sets out the vision to make Enfield a better place to live and work, delivering fairness for all, growth and sustainability and strong communities. Underpinning this commitment there are a number of priorities, the delivery of which will contribute to improving the quality of life for all residents in the borough.

In 2007 we launched our first Sustainable Community Strategy, which set out our ten-year vision for the future of Enfield. The ESP is committed to making Enfield

"A healthy, prosperous, cohesive community living in a borough that is safe clean and green."

The ESP demonstrates how local organisations are working together to make a difference and improve the quality of life in the borough by addressing important issues such as safety, health, education, housing, economic prosperity, transport and environmental sustainability.

'Enfield's Future' was updated in 2009 to ensure that it remained current. The partnership has already delivered real improvements, particularly in the most deprived parts of the borough. The revised Sustainable Community Strategy, "Enfield's Future 2009 - 2019" outlines some of our achievements and sets out how local organisations will continue to work together and co-ordinate their activities to realise our vision and deliver on our priorities to make our borough a place we can be proud of, a place people want to live, both now and in the future.

Selected relevant objectives to this AQAP are

For Children and Young People - To promote safer travel in Enfield

For Healthier Communities - To improve life expectancy across the borough, to improve life chances by reducing mortality rates from heart disease, stroke and related diseases, to increase residents' participation in regular physical activity, to encourage the use of public transport, walking and cycling

For Older People - to deliver fuel poverty initiatives such as insulation and energy efficient heating systems to vulnerable households throughout the borough

For Improving the Quality of life through: Employment and Enterprise; Environment; Housing; Leisure and Culture - to protect and improve the quality of built and open environment, to promote sustainable development and support residents and businesses to preserve natural resources, become energy efficient, conserve water, reduce pollution and address the causes of global warming, to encourage the use of public transport, walking and cycling through the promotion of safer travel

(For further details on the ESP please use the following link - http://www.enfield.gov.uk/esp/).

3.3 The Council's Business Plan 2011-2014

The Business Plan sets out the major actions that the Council, in many cases working with strategic partners and other stakeholders, is taking to achieve its vision of making Enfield a better place to live and work, delivering fairness for all, growth and sustainability and strong communities.

The Council is committed to working in partnership to improve the health and wellbeing of all Enfield's residents. This includes providing community leadership in the implementation of the Government's proposals and ensuring that local people have a greater voice in the development and delivery of local health services.

The Council is exploring different ways of delivering or commissioning services to ensure that they are sustainable and provide the best possible value for money. We are determined that our services are driven, as much as possible, by the needs and aspirations of residents across our diverse communities and the Council is committed to ensuring that these services are responsive and accessible.

Key to this approach is how the Council operates.

Embedding our values – One Team; Customer First; Achieving Excellence; and Empowering People – will enable us to be an effective, sustainable, customer-focused organisation.

Our relevant priorities in line with this AQAP that we plan to undertake are:

Growth and Sustainability

Improve Enfield's streets and open spaces through better design, cleaner streets and a greener, more sustainable environment

Develop a range of activities to mitigate the effects of climate change and reduce greenhouse emissions

Improve the sustainability of transport and reduce its impact on Enfield Develop and implement the plans to transform key areas of Enfield including Ponders End and North East Enfield; Ladderswood Way and the A406; and Edmonton Leeside including Meridian Water and Edmonton

Strong Communities

Continue to work in partnership with a wide range of organisations and public bodies to effectively address local issues

Reduce health inequalities in Enfield and improve the health and wellbeing of all residents

This Air Quality Action Plan forms part of this Business Plan and the overlapping actions are discussed further later in this plan.

3.4 Enfield planning policies

Planning systems play a pivotal role in shaping and protecting the quality of our Borough thus making a central contribution to our well being and quality of life by creating opportunities for development; conserving environmental quality; achieving sustainable development; promoting public participation; and helping to protect the rights of the individual.

The Planning and Compulsory Purchase Act came into effect in September 2004, introducing new arrangements for development planning. The Local Development Framework (LDF), which is a portfolio of documents, delivers the arrangements for spatial planning in Enfield. It replaces the existing Unitary Development Plan (UDP). The LDF spatial planning system exists to deliver positive social, economic and environmental outcomes and an integral part of the system is consultation. The preparation of the LDF is a continual process with documents being prepared and reviewed in turn to ensure that they are up to date.

In the shorter term and on its own it, the planning system will not solve Enfield's air quality problems. However it does provide a vital part in achieving future sustainable development as well as conserving existing environmental quality.

The LDF will guide planning and development in Enfield to 2025. The LDF delivers the spatial development strategy for the Borough and builds upon existing local and London wide strategies and initiatives.

Our LDF is made up of a number of documents. The Enfield Plan will not be a single document but a folder of Local Development Documents (LDDs) including:

Procedural documents:

Local Development Scheme (LDS) Statement of Community Involvement (SCI) Annual Monitoring Report (AMR)

Development Plan Documents:

Core Strategy Proposals Map Sites Schedule North London Waste Plan Enfield Town Area Action Plan North Circular Area Action Plan North East Enfield Area Action Plan Central Leeside Area Action Plan

A key document and the first document to be adopted under the Act was the Enfield Plan - Core Strategy. This development plan document was adopted November 2010.

The Core Strategy sets out strategic objectives for the Borough drawn from the current geographic, economic, social and environmental situation in the Borough; the planning challenges that need to be addressed (including the Mayor for London's London Plan and the separate Transport Strategy); and the proposed approach for addressing these challenges and the alternative approaches that have been considered. It further sets out the long-term aspirations for Enfield and indicates the broad locations for future housing, employment, retail, infrastructure and other land uses, as well as providing detailed policies that will be used to assess planning applications. Key features of the proposed strategy include a significant number of new homes by 2017 and ensuring that the expansion of population expected in North London is accommodated in sustainable communities.

The Sustainable Community Strategy will lead the LDF priorities and development of the Core Strategy and area action plans. The LDF will be the spatial expression of the Community Strategy's vision for Enfield as "a healthy, prosperous, cohesive community living in a Borough that is safe, clean and green". The Strategy's priorities and related objectives with a spatial element inform the development of the LDF's spatial vision.

The following strategic objectives outline what will need to be achieved to deliver the Core Strategy vision and address the key issues that have been identified for the Borough. Although they are numbered from 1 to 10, they are not ranked by importance.

Strategic Objectives

1. Enabling and focusing change - To meet the future needs of Enfield's existing and future population by focusing transformational change and growth in the Upper Lee Valley, in existing town centres and new neighbourhoods, where physical and social infrastructure already exists or can be improved through planned and phased development. To protect and enhance those parts of the Borough which currently offer a good quality of life to Enfield's communities.

2. Environmental sustainability - To promote a sustainable pattern of development integrating infrastructure and housing, reducing the Borough's carbon footprint, minimising the need to travel and protecting the Borough's green belt and biodiversity. To mitigate and adapt to the impacts of climate change, promoting energy efficiency and renewable sources of energy including exemplar schemes as part of regeneration of the Upper Lee Valley area. To manage and reduce flood risk and pollution, promote sustainable water management and retain sufficient waste management facilities in the Borough.

3. Community cohesion - To build upon and work together to revitalise the capacity of existing communities in those parts of the south and east of the Borough where deprivation and lack of opportunities are prevalent, particularly in Ponders End, Edmonton Green and New Southgate, and to provide a framework for the development of a new sustainable community in Central Leeside, providing a catalyst for regeneration of the Upper Lee Valley. To work with partners in continuing to make the Borough one of London's safest - supporting improvements in the safety of Enfield's streets and public spaces.

4. New homes - To facilitate the provision of sustainable constructed new homes of exemplary space and design standards to meet the aspirations of local people. To meet the housing needs identified in Enfield's Housing Market Assessment, improving the existing housing stock, developing new housing, including mixed tenure and providing housing that people choose to make their long-term home. To ensure new residential development is supported by good public transport, social, green and utilities infrastructure and achieve the maximum intensity of use having regard to development plan policy.

5. Education, health and wellbeing - To ensure the capacity and quality of local social infrastructure provision including schools and further education, health and policing facilities, social care, retail services, leisure and recreation facilities is sufficient to meet the needs of Enfield's existing population and new residents. To promote healthier lifestyles and to address the inequalities in health and educational attainment between Enfield's residents particularly in areas such as Edmonton Green, Enfield Highway, Ponders End, Turkey Street and Upper Edmonton, where these issues are more prevalent.

6. Maximising economic potential - To develop a spatial framework for a diverse and competitive economy in Enfield, maximising the economic potential of the Upper Lee Valley and town centres, enhancing appropriate employment locations and ensuring a more efficient use of land. To support new business enterprise and inward investment and economic diversity, promoting higher wage growth sectors, such as advanced manufacturing, renewable energy, knowledge based industries, leisure and services, and capitalising on the benefits arising from the London 2012 Olympics and Paralympics Games and its Legacy Transformation. To support a robust strategy for recovering from the recession, and protection from the troughs of future economic cycles.

7. Employment and skills - To support job creation and address the levels of unemployment and economic inactivity particularly in the south and east of the Borough, including amongst young people and disadvantaged sections of the community, and the development of skills to enable all residents to access the employment market. To tackle the barriers to employment facing particular sections of the community.

8. Transportation and accessibility - To enhance traffic flow by the provision of appropriate infrastructure as well as the promotion of sustainable methods of transport and a pattern of development that reduces the need to travel. To ensure development is accessible by all means of transport and that high generating uses are supported by good public transport, walking and cycling facilities. To seek improved movement and accessibility within the Borough, the North London sub region and beyond, focusing particularly on improvements to both road and public transport orbital connections, to improved east-west movement through the Borough, and to support existing and potential businesses in providing for freight movement. To maximise the benefits to Enfield arising from the proposals to improve the West Anglia railway in the Upper Lee Valley.

9. Natural environment - To protect and enhance Enfield's natural heritage by retaining the open character of the Borough, safeguarding the green belt and other open space and developing the wider network of green infrastructure in the Borough. To meet the deficiencies in open spaces which exist in the east and south of the Borough and improve access to green areas and waterways (i.e. through River Restoration projects), particularly for the communities close to the Lee Valley Regional Park.

10. Built environment - Use a design-led approach to developments and places, while addressing historic land contamination, in order to promote a step-change in the quality of the built environment and public realm, creating safe and accessible environments and improve urban greening with tree planting and landscaping. To maximise the contribution that heritage assets and existing features make, enhance local distinctiveness and identity, and create safer, stronger communities.

The spatial strategy for the future development of the Borough is two fold, firstly, to continue to protect and enhance those parts of Enfield which offer a good quality of life and secondly to take a proactive approach to focusing change in areas of the Borough where regeneration and the revitalisation of communities is needed. These are two complementary strands, which together will deliver the Council's place shaping priorities. The Council will work with its partners and use its powers to help create the conditions for growth and deliver new homes, jobs, good quality services and environments in places where people want to live and work, now and in the future. New developments will be expected to be of the highest quality, maximising sustainability principles and respecting the quality of the neighbourhoods in which they are located.

To deliver the Council's spatial strategy core policies for four strategic growth areas have been identified (core policy 1); housing and services (core polices 2 - 12); economic development and enterprise (13 - 19); delivering physical infrastructure (core policy 20 - 27); environmental protection and green infrastructure (core policy 28 - 36); and places (37 to 45). In addition a core policy has been added for implementation and monitoring.

<u>Action Plan Measure</u>

Enfield Local Development Framework

In guiding planning and development in Enfield, the LDF plays an important role in ensuring that the potential detrimental impacts from new developments are minimised; these impacts include local air quality. The Council already considers air quality during the development planning process and the designation of the AQMA presents an additional focus on local air quality during construction and operational phases of new developments. It is particularly important that proposed developments that may exert an impact on the AQMA should be subject to specific consideration in view of the potential impact on local air quality. Furthermore it is also important that all practicable mitigation measures are implemented.

Guidance on this issue has been provided by Environmental Protection UK and by the Beacon Councils, selected under the heading of "Delivering cleaner air". The Council will consider how this and other guidance can be adopted to enable a consistent approach to air quality impact assessment in the Enfield AQMA and beyond ensuring that the potential effects of future development on air quality are minimised and that appropriate mitigation measures are provided.

3.5 Enfield Carbon Management Plan

Enfield Council made earlier declarations on carbon management and in 2009 the Council was selected, amidst strong competition, to take part in the Local Authority Carbon Management programme. Enfield Council partnered with the Carbon Trust on this ambitious programme to realise large carbon and cost savings. Under this the Council established a Carbon Management Plan, which commits to a target of reducing CO_2 by 25% by 2014 and underpins potential cumulative financial savings to the Council of around £3.6 million over the five-year period from 2008/09 baseline levels of nearly 42,000 tonnes. This collectively works towards the Government's national long-term carbon emissions target reduction of 80% by 2050.

The Council's Carbon Management Plan determines baseline carbon emissions and includes projects, both technical and strategic, which will also collectively work towards the Government's national long-term carbon emissions target reduction of 80% by 2050. To ensure the Council meets its challenging carbon reduction target, the Carbon Management Plan has been used to capture

energy saving projects and initiatives with the potential to deliver carbon reductions from our 2008/9 baseline levels. The Plan is updated every 6 months and includes:

- Projects already underway (or completed) and funding allocated
- Projects planned to take place which will be funded through the Council's capital spending programme or through the Salix Finance Ltd Recycling Fund; includes projects that were originally near term and medium to long term as at March 2010 and new projects
- Near term projects (i.e. that are planned to take place but do not yet have funding allocated)
- Medium to long-term projects (i.e. that may take place in the five years and do not have funding allocated at this stage)

At the fourth six month review in April 2012, the revised list of projects were calculated to deliver potential cumulative cost savings of \pounds 6.3m and a cumulative carbon reduction of 39,643 tCO₂ over the 5-year period. The cost of these projects was projected to be approximately \pounds 5.9m over the 5-year period.

3.6 Enfield Air Quality

The Council is committed to improving air quality and has previously declared the whole of its area as a Smoke Control Area. We are currently still doing our best to improve air quality and reduce emissions that can harm the environment. As part of this the Council also established an early commitment to undertaking air quality monitoring and providing information to the public through the London Air Quality Network.

Action Plan Measure

Integration of Air Quality with other Enfield Council Strategies

The Council recognised the benefit of increasing the general awareness of air quality issues and the need to integrate air quality considerations within existing and future Council plans and strategies.

The London Borough of Enfield also uses Section 106 agreements to mitigate the effects of transport pollution arising from new developments. Developers in the Borough are required to contribute towards sustainable transport measures. The Council routinely uses their model Section 106 agreement for major new developments to secure contributions towards a variety of initiatives to reduce emissions and incentivise low emission fuels and technologies.

Low emission measures in the Borough include the installation of two publicly accessible electric vehicle charging points in Palace Gardens Car Park in Enfield Town. The Council plans to introduce further charging points in other car parks in the near future.

3.7 Greener Enfield

Sustainable Procurement - The Council has developed a new Corporate Procurement Strategy 2011-2015, which incorporates the Council's Sustainable Procurement Policy to enable the Council to have a more robust approach to the sustainable procurement of Goods, Services and Works and incorporate socio-economic and environmental considerations into procurement practice.

Environmental crime - the Public Health Team has a clear objective to tackle environmental crime and is able to fully exercise the legal powers available to Enfield Council. This helps support two key aims of the Council for a Cleaner Greener Enfield and making the Borough a safer place to live, work, study and do business by reducing crime and the fear of crime through an improved environmental public protection service.

The Planning Enforcement Team is integrated into the powers and functions of a range of enforcement teams, including Street Scene Enforcement and Public Health and Nuisance. They are able to work closely with Licensing, Environmental Health, Food Safety, Development Control, Building Control, Waste and the Anti Social Behaviour Team.

4.0 Transport policies covering Enfield

4.1 Background

Road transport has been highlighted as the principal source of pollutant emissions in the Council's AQMA. Transport, however, also plays a significant part in our daily lives, so it is essential that policies and plans regarding transport integrate with other initiatives in supporting the achievements of the Council's priorities.

An important objective of this Air Quality Action Plan is balancing the need to travel with the need to improve quality of life, including air quality. This can be achieved through working to integrate and promote initiatives that can reduce congestion, improve local environments and encourage healthier and safer lifestyles.

Enfield is one of the largest London Boroughs, occupying 30 square miles of outer north London between the A406 North Circular Road and the M25 motorway. The centre of Enfield is 12 miles from the centre of London. Enfield has good links to the national motorway system, the north of the borough being bounded by the M25, accessed at junctions 24 and 25. It also has two trunk roads – the A10 (London to Cambridge) and A406 (London's North Circular Road).

Over the last 30 years, weekday traffic growth in the Borough has been at an equivalent compound growth rate of the order of 1.60% per annum. This contrasts with corresponding figures of 0.55% in Greater London and about 3.0% in Great Britain. The general growth rate of 1.60% conceals considerable variation between times of day and classes of roads. Growth in the peak hours, at about 0.9%, has been considerably less than that applicable to the 24-hour day. As a result of research showing the significant effect of road traffic on local air quality the whole Borough has been declared an AQMA.

As highlighted the air pollutants of concern in the Council's Borough-wide AQMA arise principally from road transport emissions. Transport for London (TfL) has responsibility for core trunk routes in Enfield and the Council has responsibility for non-core trunk routes and other roads. Hence the Council only has partial responsibility for roads in the Borough. The London Boroughs however work closely with TfL to provide a range of local transport initiatives. These can include road safety schemes, town centre improvements and walking and cycling projects.

The tighter vehicle emission standards required by the EU have been amongst the most important air quality management tools for reducing emissions. In recent years these standards have resulted in improved air quality for many pollutants. This remains an ongoing process that will continue into the future, resulting in the replacement of older more polluting vehicles with newer less polluting vehicles, although any expected improvement is lessened by increases in both the numbers of vehicles on roads and also the distances travelled.

Furthermore recent air quality monitoring data, from London and also within the Borough, confirms that the expected air quality improvements have not been forthcoming. Instead it has become clear that over the past 5 years or more that the concentrations of NO_2 and NO_x have not been reducing. This is in stark contrast to the downward trend calculated by emission inventories, which are based on the expected improvements in emission performance of road vehicles (as the main source of NOx in urban areas). Legal limits for emissions from road vehicles have been tightened periodically since the late 1970s through the 'Euro standards' prescribed for new cars, light vans and heavy-duty vehicles. A big improvement came in 1993 when the use of catalytic converters on petrol cars was first required. As a result urban levels of these pollutants fell significantly when petrol cars dominated the fleet. However, since about 2004, levels particularly of NO_x and NO_2 have remained broadly constant in urban and traffic locations and in some places have even begun to increase.

This was the subject of a study led by King's College London and funded by Defra. This study undertook measurements of emissions from vehicles in real-world conditions using a remote sensing technique and other emission measurements (in real driving conditions) elsewhere in Europe. From the results it became clear that the emissions of vehicles in day-to-day driving conditions in cities, particularly from diesel cars, have not been decreasing. This indicates that the standard legal emission test does not test all types of driving condition, so that diesel cars pass the legal emission requirements but in real-world use their emissions are different. This has meant that actual emissions of NO_x from diesel cars have not improved in the last 10-15 years or so. The study also showed that emissions of HGVs remained roughly static until the Euro IV standard when around 2007 they began to fall. Bus NO_x emissions appear to have remained broadly constant, or even increased, over the past 10-15 years. The use of oxidation catalysts and other similar treatments of diesel exhaust to remove harmful particles (soot) from the exhaust, has also led to an increase in the fraction of the NO_x that is emitted as NO₂. This is a Europe-wide problem, as all EU cars have to meet the same limits and use broadly the same technologies.

The initial conclusion to be drawn from the above discussion is that additional measures are needed to reduce air pollution and improve air quality in the AQMA so as to achieve the required air quality standards. Hence any policies that encourage the removal of the more polluting diesel cars from the fleet would be beneficial. So too of course would measures to reduce overall mileage and car use. The importance of the integration of this Air Quality Action Plan with the Local Implementation Plan is therefore a key objective to improving air quality within the Council's AQMA.

4.2 Enfield's transport policies

The Mayor of London approved Enfield's Transport Strategy (the core of which is its second Local Implementation Plan (LIP) for Transport) in 2011. The new plan was prepared with partners and stakeholders and consulted on during the previous twelve months. It includes specific transport proposals that will be implemented in the three year period from April 2011 to March 2014, and will also include a vision for the development of transport in the Borough in the longer-term.

There is a particular emphasis in the Transport Strategy on linking transport with the Council's wider agenda for the economy and regeneration, education, employment, health, equality and social exclusion, crime and the environment.

The overall goals of Enfield's Transport Strategy are the same as those of the Mayor of London's Transport Strategy (MTS). Within the context of these overall goals, a number of specific local transport aims are to be addressed by our programmes in the Transport Strategy.

These aims are as follows:

- Creating a transport network that is accessible and safe for all;
- Encouraging the use of sustainable modes of transport to reduce congestion and parking stress, and responding to the local causes and impacts of climate change;
- Improving poor bus links between strategic growth areas and town centres;
- Providing good quality orbital public transport links to improve access to jobs and services, and better access to public transport in the east of Enfield;
- Smoothing traffic flows and providing good access to the strategic road network while protecting the amenity of residential neighbourhoods;
- Improving the street scene and access to green and open areas;
- Supporting proposed improvements to the West Anglia Mainline in the Lee Valley;
- Enhancing the environment and improving links to the Upper Lee Valley to support growth.

Action Plan Measure

Enfield Transport Strategy

Road transport has been identified as the principal source of NO_x / PM_{10} within the Enfield AQMA. It is important that this Air Quality Action Plan supports and considers the Transport Strategy, and vice versa. Therefore some integration of the Action Plan with the Transport Strategy is considered essential and represents a strategic and integrated approach to local air quality management, as it presents a key platform for delivering initiatives aimed at improving local air quality.

5 Transport related options for the Air Quality Action Plan

5.1 Introduction

As outlined earlier, the LAQM process across Enfield has been ongoing for more than 10 years and during this time there have been some notable improvements in air quality, for some pollutants, in the Borough.

Other air quality improvements based on other pollutants however are proving much more difficult in Enfield, mainly due to its location as a part of Greater London, plus the mainly dense urban nature and the associated high levels of road transport. Both London wide and Borough wide transport related options to improve air quality have been already instigated earlier, including the introduction of the Low Emission Zone by the Mayor for London. It can therefore be seen that air quality management options are already ongoing. The next section builds on these achievements and follows the recommended guidance for Air Quality Action plans.

5.2 Options appraisal

Recent government practice guidance provided detailed, but non-mandatory advice, on the economic principles and appraisal methods, which can be applied for the assessment of local air quality measures and schemes. First, there is a scoping stage to draw up a list of options with an assessment taking into account the costs and benefits of the measures. This is followed by a more detailed stage or business case that examines the most promising options in more detail.

However the above mentioned guidance also notes that it is only proportionate to undertake the significant more detailed phases for larger air quality proposals, rather than any very small air quality proposals. It also indicates that for the majority of AQMAs in the UK most proposals are likely to be small scale.

The Action Plan also needs to consider the wider economic, social and environmental impacts, bearing in mind any other legal requirements and policy drivers. This meets with the general sustainable development principle. A wide range of potential options may be available to improve local air quality within the AQMA and these all need to be considered at this stage of the action planning process.

The identification of potential measures was undertaken through a review of existing local and regional plans, consideration of measures referenced in PG 09 and other relevant guidance documents. Whilst the Council may not have the necessary powers to implement all such options, they may work with, or encourage other organisations and agencies that have the capacity to take such options forward.

A summary of the groups of transport related measures is given in the following table along with brief descriptions and commentary notes. The purpose of this table is to provide a short analysis of the likely choices available to seek air quality improvements in the Enfield AQMA. Note the non-transport related measures are discussed later.

	Type of measure	Description	Comments
A	Removal of pollution source from exposed population	The construction of new roads, the pedestrianisation of areas, or other road alterations could divert traffic away from the most polluted roads in the AQMA resulting in improved air quality.	The opportunity to make such changes to roads in Enfield is extremely limited. The option also moves emissions to another location with no requirement to reduce them and so it is possible that overall emissions may be increased.

Table 1 Possible transport related measures

В	Removal of exposed population from pollution source	This requires the removal (physical or otherwise) of those houses, etc that are identified with relevant public exposure.	The opportunity for this does not exist in the Enfield AQMA or is highly limited in the extreme. As with Option A there is also no requirement to reduce emissions.
С	Reduce emissions from sources using vehicle/ fuel technology	The majority of vehicles using roads in the AQMA are powered conventionally and are of a range of ages. Technical options to convert vehicles into ones using cleaner engine and fuel technology exist. By requiring uptake of these technologies the emissions in the AQMA would be reduced.	The opportunities are likely to be limited and experience elsewhere has shown that technology does not always work in a positive sense for all emissions, with the benefits for one pollutant traded against negative aspects for another.
D	Reduce emissions from sources by reducing the demand for travel or achieving better travel choices	This could be achieved either through reducing the need to travel, or by ensuring that travel is via a less polluting form of transport. To do this policy changes are required to influence choice.	This measure is ongoing both nationally and locally and an increased emphasis is feasible. The policies can also lead to the reduction in emissions of all pollutants (and greenhouse gases).
E	Optimisation of traffic movement through in the AQMA	Changes in traffic management in the AQMA (using traffic management and restriction) may reduce emissions by either diverting some traffic onto better routes for them or by reducing congestion/ stationary traffic or by restricting vehicles based on a factor, e.g. based on registration number.	The opportunities for such actions are likely to be limited due to the nature of the AQMA.

5.3 Outline discussion of options

5.3.1 Option A

From the above summary it can be seen that the option to remove the source of emissions, i.e. road traffic from the AQMA, is not wholly realistic in Enfield for a variety of reasons. Typically this type of measure is most relevant where there is a busy through route or major road in a town or village. In this situation the building of a bypass road outside of the build up area reduces the traffic leading to an immediate improvement in air quality. In an urban area, such as the Enfield, the build up character of the area and existing development pressures severely limit this option. The option is also likely to be long-term due to the potential funding, planning and legal difficulties.

In view of these reasons Option A is not considered further in this plan

5.3.2 Option B

This is similar to option A with the requirement to reduce relevant public exposure to pollution, essentially through moving those people likely to be affected away from the source. (This is based on the concept of relevant exposure as described in the government's guidance for Local Air Quality Management). Theoretically this could be achieved by relocating those at any identified sites, which exceed the objective. In reality this is not a feasible option due to societal and other practical reasons, plus cost. It would also not lead to improvements in air quality.

In view of these reasons Option B is not considered further in this plan

5.3.3 Option C

This considers the reduction of pollution directly from vehicles using technology. To achieve this, a local authority can consider the retrofitting of abatement equipment, as well as related measures, such as increasing the uptake of low emission vehicles and the use of low emissions zones (known as LEZs). Retrofit schemes are based on locations, where the most polluting of vehicles are encouraged to retrospectively install technologies to reduce emissions. The most significant example of measures to encourage retrofitting of abatement equipment is the London Low Emission Zone (LEZ), which of course already encompasses the Council's area.

The aim of such schemes is to reduce the emissions of the most polluting vehicles in a particular area by setting particular emission standards or criteria encouraging them to retrofit abatement equipment, with the aim of improving overall local air quality. Careful examination of the technologies is however required to ensure that the reduction of one pollutant does not lead to increased emissions of others. For example, some particulate control technologies using oxidation catalysts can lead to an increase in the proportion of NO_x emitted directly as nitrogen dioxide (NO₂), which would be inappropriate in the Enfield AQMA. One other important feature of a retrofit scheme is the need for systems to certify and identify any vehicles that have had abatement equipment retrofitted.

A Low Emission Zone (LEZ) is a geographically defined area where the most polluting of vehicles are restricted, deterred or discouraged. The aim is improve air quality by reducing the number of more polluting vehicles in the area, based on particular emission standards (such as Euro vehicle emission standards). In many cases the intention is to bring the use of lower polluting vehicles forward in time. The most significant scheme in the UK is again the London LEZ scheme, although other smaller examples exist in Europe.

Sections 1, 6 and 9 of the Road Traffic Regulations Act 1984 give local authorities extensive powers to make traffic regulation orders (TROs) which are used with Low Emission Zones. These powers can prohibit, restrict or regulate traffic or particular types of vehicle to a whole or part of any road(s) that the local authority is responsible for. In smaller schemes, section 106 agreements as planning obligations for site usage can be used.

Examples to increase the uptake of low emission vehicles also include the London LEZ, whereas other schemes are the Quality Bus Partnership Agreements in South Yorkshire which required Euro III buses on designated routes; the discounted car parking charges of up to 100% for vehicles with zero local emissions in Westminster and lesser discounts for Low Emission Vehicles in other locations; plus voluntary schemes with economic incentives such as Car Clubs that have successfully cut operators costs and emissions.

The London LEZ requires relevant vehicles to comply with the specified scheme used. The only other alternative is the payment of a substantial daily charge. This however is intended to deter those not complying with the scheme. Specifically since 2008 the London LEZ requires a standard of Euro III for particulate matter (PM) for lorries more than 3.5 tonnes, and buses and coaches with more than eight seats plus the driver's seat over 5 tonnes. From 3 January 2012, a standard of Euro III for particulate matter for larger vans and minibuses and a standard of Euro IV for particulate matter for lorries over 3.5 tonnes is required. The findings of the LEZ and overall impact on air quality are hard to discern but reports have indicated a reduction in pollutant emissions, as well as extensive compliance by vehicle operators (Transport for London, 2010).

Major considerations in setting up a LEZ include the cost of setting up and policing the scheme. As Enfield lies within the London LEZ, the development of a specific LEZ within the Enfield AQMA would result in possible confusion with the London LEZ. An alternative option would be to consider (and update) the example of the Greenwich Peninsula LEZ, which was based on planned developments. Specific detailed local studies would be required to identify most appropriate measures if a LEZ option were to be considered further.

It is also important to note that the major considerations for a LEZ do not preclude the use of other measures to increase the uptake of low emission vehicles in Enfield.

Option C is therefore considered further in this plan

5.3.4 Option D

As already stated, this option is ongoing both nationally, through the introduction of improved Euro standards for road vehicles and also locally through the implementation of the Transport Strategy and the development of the Local Development Framework. Thus this is an ongoing option. The Council can specifically provide leadership on some of these measures.

Option D is therefore considered further in this plan

5.3.5 Option E

This option seeks to reduce emissions of pollutants by aiming to remove vehicles from the AQMA and/ or by reducing congestion, which leads to stop start traffic conditions potentially exacerbating emissions of pollutants. As with the above option D such measures have been ongoing however this has not always been from the perspective of improving air quality. As a result this option should be considered further.

Option E is therefore considered further in this plan

5.4 Detailed transport options for the Enfield AQMA

The Council will consider the use of specific transport measures and interventions to deliver key elements such as:

- Incorporating appropriate physical measures in infrastructure schedules (Options C, E);
- Identifying and agreeing options for the enforcement of existing regulations for parking, loading and utility works schedules (Options C, D, E);
- Identifying and agreeing options for supporting travel choices that are better for air quality (Options C, D, E).

All of these can be implemented as and when funding becomes available. Each measure or intervention should achieve one or more of the following outcomes:

- Restrain or reduce traffic volumes;
- Reduce traffic delays;
- Reduce tailpipe emissions of air pollutants per vehicle; or,
- Improve the provision of information to people on the air quality impacts of their travel choices.

5.4.1 Incorporating physical measures in infrastructure schedules

5.4.1.1

These measures can include physical arrangements for on-street parking, loading and traffic routing. The source apportionment earlier indicated that HGVs make a significant contribution of emissions of NOx within the AQMA, but comprise a relatively small proportion of traffic (representing less than 10% of the total number of vehicles). This may therefore represent an opportunity for a targeted and effective approach to improving air quality based on reducing emissions from HGVs within the AQMA.

Potential proposed measures can include assessing the feasibility of diverting HGVs along roads other than those hot spots in the AQMA. There are likely to be many constraints precluding this, including physical and access issues, plus road safety. However the opportunity to investigate and prioritise such options needs to be taken.

5.4.1.2

These measures can include developing traffic control systems and traffic signal strategies. Traffic queuing can result in elevated concentrations of air pollution and create localised hot spots within the AQMA. These may possibly be reduced by the phasing of traffic signals facilitating the smooth flow of traffic along given streets.

Traffic surveys in hot spots will assist in assessing for this measure. The use of traffic management systems with synchronised fixed time signals can then assist with addressing peak hour congestion and queuing at key junctions, along with ensuring that any queuing management system reduces emissions in the narrowest 'street canyon' sections of the AQMA. The successful implementation of such traffic management systems should help to reduce congestion, as well as emissions from road traffic sources across the AQMA.

5.4.1.3

Raising awareness of the AQMA is important; along with the promotion of options for people to contribute to improving local air quality can lead to long-term benefits for local air quality. Informing members of the public and local organisations about local air quality issues is very important to help achieve success with improving air quality in the AQMA and more generally. To raise the awareness of the AQMA, the Council can consider erecting signs at various locations to alert drivers to the presence of hot spots in the AQMA and encouraging behavioural change e.g. reduce vehicle idling.

Keeping Traffic Moving

Traffic congestion in Enfield is a growing problem and the A406 North Circular is particularly congested between Bounds Green and Green Lanes. Traffic congestion causes poor air quality, noise pollution, rat running and safety issues for other road users. Enfield Council does not manage some of busiest roads in the Borough (such as the A406 North Circular and the A10, which are managed by TfL, or the M25, which is managed by the Highways Agency). However, the Council can lobby or campaign for improvements to be provided by these organisations.

The Council plans to spend approximately £750,000 on improving traffic flow in Enfield over the next three years, and we believe that the main priorities are:

To smooth traffic flow through the adjustment of traffic signal timings and the introduction of traffic signal efficiency technology;

To co-ordinate street works to reduce delays and disruption;

To introduce and enforce proportionate waiting and loading restrictions;

To work with TfL to improve strategic roads, particularly the A406 North Circular;

To improve key junctions on the A1055 and other strategic routes;

To assess the road network in Central Leeside and the rest of the Upper Lee Valley.

Environment

The Council is aware of the importance of improving the local environment in the Borough and mitigating for the impacts of noise, air pollution, and climate change. The Council plans to spend approximately £280,000 on improving the environment over the next three years, and we believe that the main priorities are:

To introduce electric vehicle charging points in key locations;

To monitor air quality in 10 strategic locations and implement mitigating measures if necessary;

To plant trees along streets to improve the urban environment;

To produce Action Plans for noisy roads, as per the European Noise Directive.

5.4.2 Enforcement of existing regulations

5.4.2.1

The decision to use a car for journeys is greatly influenced by the availability and cost of parking. The Council's Parking Enforcement Plan seeks to control and manage parking and it therefore has an important role in reducing reliance on the car. Measures addressing parking also contribute to reducing congestion and other traffic management. The Council also seeks to support policies to encourage travel by sustainable modes, whilst also supporting development and economic growth. The Council administers the Controlled Parking Zones (CPZs) and formal parking places within the

Borough. The monitoring of the length of stay restrictions and parking controls, as well as continued enforcement in hot spots in the AQMA can also help reduce emissions.

The supply of parking in the Borough, especially on-street kerb-side space, is under growing pressure with increasing car ownership. The Council plans to spend approximately £1.1m on improving parking over the next three years, and we believe that the main priorities are:

To manage parking better to reduce congestion; improve safety; and ensure a turnover of spaces to help maintain the viability of town centres;

To review existing Controlled Parking Zones on a regular basis and to consult with residents on the introduction of new Controlled Parking Zones in areas with high levels of parking stress;

To prioritise enforcement to achieve our parking management aims.

5.4.3 Supporting beneficial travel choices that are better for air quality

5.4.3.1

The purpose of travel plans is to seek to address the negative impacts of car travel, notably single occupancy vehicles, by encouraging car sharing, or a shift to more sustainable forms of transport, such as walking, cycling and public transport; or alternatively reducing the need for travel. Such plans typically recognise that one solution is unlikely to be suitable for everyone and thus the focus is on encouraging the consideration of alternative forms of travel through the provision of incentives such as improved cycle facilities, flexible working arrangements and discounted public transport. As a result travel plans have been widely adopted and promoted. The Council also requires that a Travel Plan be prepared as part of the supporting documentation for a planning application e.g. where there is proposed employment development.

Increasing the number of travel plans is considered important to reduce emissions, as well working with local businesses/ organisations to encourage the development and implementation of travel plans.

5.4.3.2

School Travel Plans represented a commitment from schools to develop a package of measures aimed at encouraging healthier, safer and more environmentally friendly methods of travelling to and from school by parents, pupils and staff. The Council has lead responsibility for helping schools to implement school travel plans. Continuing to support the implementation and updating of School Travel Plans is considered important to reduce emissions.

Smarter Travel

There is a relatively high level of private car use in Enfield compared with other London boroughs (nearly 50% of residents travel to work by car, compared to an average of 36% across London). Increasing car ownership is resulting in growing levels of traffic congestion and pressure on available parking space. As a result, the Council believe that it is important to raise awareness of alternative forms of transport and to promote the use of non-car modes, particularly walking and cycling.

The Council plans to spend approximately £1.2m on encouraging people to walk and cycle where possible and to reduce car use over the next three years, and we believe that the main priorities are:

To provide cycle training, including free cycle training for children;

To establish "Road Rangers" in primary schools to promote road safety and sustainable travel to school;

To promote the use of lower carbon modes and eco-driving practices;

To support the expansion of car clubs and encourage their use of ultra low carbon vehicles;

To work with businesses to promote public transport, walking, cycling and car sharing.

5.4.3.4 Buses

Buses and coaches provide an essential component of public transport in Enfield; they also represent an important alternative to cars. However, as shown in the source apportionment earlier, buses can also make a significant contribution to emissions of NO_x . Consequently it is important to assess what can be done to minimise emissions from fleet vehicles. Lobbying TfL to try and reduce emissions from buses operating within the AQMA is important, particularly within hot spots.

<u>Buses</u>

Poor bus links between strategic growth areas and town centres in Enfield is a significant problem, while bus priority needs to be improved generally to speed up journeys and make buses more reliable. Enfield Council does not provide or operate bus services in the borough, which are the responsibility of TfL. However, the Council can lobby and campaign for improvements in bus services to be provided by TfL.

The Council plans to spend approximately £460,000 on complementary measures to improve bus services over the next three years, and we believe that the main priorities are:

To improve bus reliability and journey times with new bus priority measures, particularly on routes 121, 191, 259, 279 and 341;

To lobby for new services in areas with poor public transport;

To improve the accessibility of bus stops, particularly for the disabled;

To plan for new services in Central Leeside and the rest of the Upper Lee Valley to support future growth.

5.4.4 Borough led planning processes and responsibilities

5.4.4.1

Measures relating to the Local Development Framework were discussed in the previous chapter. The Council is identifying a method to obtain contributions from new developments. These contributions can be used to finance new infrastructure including measures such as cycle lanes, improved public transport, public awareness campaigns, etc. that can help to improve air quality.

5.4.4.2

The Council also has important responsibilities in leading by example and targeting reductions in emissions from its transport fleet activities as much as practicable.

5.4.4.3

Promoting cycling and walking represents a key objective to improve air quality in Enfield. The Council aims to encourage members of the public to consider walking or cycling instead of using their car, and as a consequence, promote healthy lifestyle choices and environmental improvement by reducing the number of cars on the road.

Cycling

The cycle network in Enfield is planned to provide safe and attractive routes linking residential areas and key destinations, but infrastructure and facilities need to be improved in a number of locations. The Council would like to encourage cycling in the borough, particularly for trips of 5km or less.

The Council plans to spend approximately £2.2m on improving cycling over the next three years, and we believe that the main priorities are:

To provide a network of 'Greenway' cycle and walking routes using parks, open spaces, quiet traffic routes, and 20mph zones;

To increase the provision of cycle routes and cycle parking generally;

To improve cycle routes to schools;

To work with the NHS to promote the health benefits of cycling;

To work with the Lee Valley Regional Park Authority to improve cycle facilities and infrastructure.

Walking

Almost all journeys involve walking in a local neighbourhood or town centre. Although some areas in Enfield, particularly in the northwest, are very pleasant to walk in, others are difficult to navigate on foot. In the east, the Lee Valley rail line, strategic north-south roads and the A406 North Circular Road act as significant barriers making the Lee Valley Regional Park relatively inaccessible by foot. On top of the funding set aside for maintenance of footways, the Council plans to spend approximately £600,000 on improving walking over the next three years, and we believe that the main priorities are:

To improve the public realm around stations and borough 'gateways';

To improve the provision of maps and information, lighting, and disabled access on the pedestrian network generally;

To improve the condition of footways and footpaths, reduce street clutter and improve the public realm;

To work with the NHS to promote the health benefits of walking;

To work with the Lee Valley Regional Park Authority to improve pedestrian facilities and infrastructure.

6. Identification of Non Transport Related Measures

6.1 **Proposed actions**

The following sections apply to the Council's AQMA.

6.2 Raising Public Awareness through the Council Website

The Council undertakes air quality monitoring across the Borough. The high quality continuous monitoring undertaken is part of the London Air Quality Monitoring Network (Londonair), which provides air quality information to the public and others. This information is available from its website (see http://www.londonair.org.uk/london/asp/lahome.asp). The site contains general air quality information, together with up-to-date monitoring data and links to other websites.

Downloadable copies of some Council air quality documents are also available from the Council's website (see http://www.Enfield.gov.uk/downloads/413/pollution_control-air_quality).

The content of this site is reviewed regularly and updated as new information becomes available.

6.3 Industrial Emissions

Although road transport accounts for the greater part of pollution related emissions of nitrogen oxides and PM_{10} in Enfield, other sources including those from industrial emissions are contributory factors to air quality and therefore should be considered.

The Pollution Prevention and Control Act 1999 sets out the Integrated Pollution Prevention and Control (IPPC) regime, building on the previous system under the Environmental Protection Act 1990. Local authorities are the regulators for Part A2s, as well as Part B installations, and the Environment Agency is responsible for Part A1 installations. Both systems regulate air pollution from industrial sources, the former controlling small/medium size operators and the latter dealing with larger operators. Under the regime site operators are required to obtain an Environmental Permit from the relevant regulator. The permit sets out conditions relating to operation that the operator is required to meet, along with the requirement to apply 'Best Available Techniques' (BAT). Local authorities are required to maintain a Public Register of all Part A and B installations. The Borough currently has 111 Part B installations, including petrol stations and dry cleaners. There are also larger Part A1 installations within the Borough.

Other industrial premises are controlled by nuisance powers under the Environmental Protection Act 1990 and the prohibition of dark smoke from industrial or trade premises under the Clean Air Act 1993. The latter legislation makes it an offence to burn any material that is likely to produce dark smoke. Under this Act the Council can take action even after a fire has extinguished if there is evidence of material on the fire, such as plastics and rubber, which may have given rise to dark smoke. This is particularly useful where unscrupulous individuals/ businesses burn waste at night, hoping to avoid detection.

6.4 Energy Efficiency

The aim of the Council's Carbon Management Plan is to reduce the carbon emissions in the Borough and set future targets and incorporated into the strategy.

Under this the Council will focus firstly, on reducing the carbon emissions from the Council's buildings and fleet and secondly, on developing and promoting measures to reduce greenhouse gas emissions resulting in the Borough, particularly in respect of schools and suppliers.

A management structure has been set up to ensure corporate involvement and agree target reductions.

7. Impact assessment

7.1 Introduction

The Enfield Air Quality Action Plan recognises that different service areas within the Council are needed for successful implementation as well as other bodies outside the Council. The actions, included for Enfield Council, are mostly outlined within the Council's corporate priorities, which as previously outlined, are assessed each year.

7.2 Impact assessment

The Council's Air Quality Action Plan has also considered that there are wider impacts to the measures proposed, since it is clear that many of the actions have other non-air quality impacts. These considerations were considered when the Air Quality Action Plan was formulated although a further examination of these may be required if more detailed information becomes available. Additional benefits and shortfalls of air quality improvement measures were assessed in terms of:

- 1. Other (non-NO_x) air pollutants those measures aimed at reducing emissions of NO_x from combustion sources through direct and indirect measures will in many instances lead to reductions in greenhouse gases and other toxic pollutants.
- 2. Congestion measures to reduce car use and increase use of other sustainable modes e.g. cycles and walking will remove vehicles from the road in the short term and thereby relieve congestion. If however congestion is relieved there is a potential for increasing traffic speeds with the consequent potential impacts of increased noise and emissions.
- 3. Attractiveness of public transport this is an important consideration since any increase in public transport must be accompanied by improved attractiveness of stock and infrastructure, including public safety issues.
- 4. Economic vitality of local businesses this is a consideration of many of the planning and transport planning related actions.
- 5. Social impacts including accessibility to buses and other transport, as well as for example potential changes to car parking.
- 6. Other many of the actions proposed relate directly to Council only based actions. This provides an important signal to others in the Borough that the Council is leading on initiatives to improve air quality, including promoting and educating good practice.

Implementation

In developing this AQAP key partners have been identified. These are indicated in the Action table and outlined in the following table.

Table 2 Responsibility for AQAP actions

LBE	London Borough of Enfield
Others	OTHERS

Note: others include key partners such as the GLA and TfL.

8. Cost Effectiveness

8.1 Introduction

The purpose of assessing cost effectiveness is to enable actions to be prioritised in order to determine which short listed actions are to be implemented and in what order.

The Enfield Air Quality Action Plan, in line with the government's guidance, does not provide a full cost benefit analysis. To do so would entail a highly detailed study of the air pollution reduction costs e.g. the cost of improving air quality by 1 μ g m⁻³ in the AQMA, as well as the health benefit and other costs associated with any air quality improvements. Such an analysis would require significant effort.

The guidance therefore permits a more simplified assessment that relies on judgment and practice, although it is important to note that some measures in this Air Quality Action Plan are still in development and therefore further definition may be required.

8.2 Cost effectiveness

The value of assessing the cost effectiveness of the actions is very limited for a number of reasons. These include that the Council and its partners were carrying out many of the actions described in this plan prior to formulation. Furthermore, other actions included in the Air Quality Action Plan include existing statutory duties of the Council and therefore must be carried out regardless.

There is also no accepted means for assessing the cost effectiveness of actions. A precise quantitative assessment is very difficult to achieve given the difficulty in obtaining accurate costs and accurate measures of air quality impacts. For these reasons, a quantitative method of prioritisation has been adopted based on professional judgement.

First a separate rating of the potential changes in air quality is required. To derive this descriptive ratings are used that are based on judgement. These ratings indicate the change that might arise from a given action and relate to potential improvement. The rating relates to the source apportionment study (where possible), the likely traffic or other impact or change within the AQMA and wider Borough and a judgement on the overall magnitude.

Air Quality Rating	Definition
Low (1)	Impact is small. Will be beneficial as part of a wider measure.
Medium (2)	Impact improves air quality and benefits from the action(s) are considered important and clearly seen.
High (3)	The impact on air quality improvement is considered significant and the actions(s) are seen as core.

Table 3 Air Quality impact rating descriptions

Alongside the air quality rating, we need to derive an understanding of potential monetary costs. To derive this indicative monetary costs of the individual actions are estimated; these relate to the costs of the action and consequently the costs are mainly but not necessarily for the Council only; they might be shared or be the responsibility of another party. The costs also do not include the costs that may be incurred by third parties that might be affected by the actions. However where these could be important a separate comment is included.

Table 4 Cost rating descriptions

Cost rating	£ cost banding	Description
Low (3)	< 50k	Includes cost is covered by normal existing budget
Medium (2)	50k – 200k	Additional funding is required, but this may be incorporated within forward planning.
High (1)	> 200k	Additional funding is required that cannot be incorporated into existing budget

These air quality and cost ratings are used to determine the cost/impact shown in the Air Quality Action Plan table (see Table 6). It is considered that existing Council budgets are able to meet the costs of most of the actions defined within the low cost rating definition. Those actions categorised as medium or high may require additional funding.

The actions described in this Air Quality Action Plan will have a greater chance of success where there is public support and where they strike a balance between environmental and other objectives such as improvements in human health, noise, safety etc. The achievement of air quality objectives must therefore not be considered in isolation, although the definition of 'cost' in this Air Quality Action Plan is not intended to encompass such additional impacts.

A matrix has been used to assign an overall cost effectiveness value. This value between 1 and 9 is based on how much of an improvement in ambient air quality the action will achieve and what is the likely cost using the judgements based on cost and air quality impact. The most cost effective actions i.e. those where there is a low cost to the Council and its partners, but a high air quality impact are given a value of 9. Conversely those actions that are high cost but with low air quality impact are given a value of 1.

Cost x impact = effectiveness	High Impact (3)	Medium Impact (2)	Low Impact (1)
High cost (1)	3	2	1
Medium cost (2)	6	4	2
Low cost (3)	9	6	3

 Table 5 Cost Effectiveness Matrix

In many instances actions are ongoing. In addition the time scales for when the action are expected to take place are indicated as short, medium or long term. In these instances short term relates to action starting within a period of twelve months; medium term relates to the period within the next two to three years and long term to three years and beyond.

8.3 Monitoring progress on the Enfield Air Quality Action Plan

The actions set out in Table 6 will be reviewed and assessed twelve months after the Council has adopted the revised Air Quality Action Plan. The progress with the actions will be provided in the annual Air Quality Progress reports that are produced by the Council. The following table of actions includes a note of the monitoring to be undertaken, where this is feasible and has been identified.

 Table 6 Air Quality Action Plan Proposals

	Action	Who	When	Cost	AQ Impact	Effectiveness	Wider Impacts	
Detailed Strategic Measures								
1	Seek the integration of the Enfield AQAP with the LDF and ensure that all development proposals with the potential to exert an impact on the Enfield AQMA continue to be assessed for air quality impacts and where permissible, appropriate mitigation measures are provided.	LBE	(Short/ Long- term)	Low	High	9	This is an on going action that can promote sustainable development.	
2	Continue and enhance joint working within the Council to encourage the integration of air quality within existing and future Council strategies.	LBE	(Short/ Long- term)	Low	High	9	This is an on going action.	
3	Continue to integrate the Enfield Transport Strategy with the Enfield AQMA and so seek the improvement of air quality.	LBE	(Short/ Long - term)	Low	High	9	This is an on going action.	
Detailed trans	port options – Keep Traffic Moving							
4	Effectively monitor and manage existing network and smooth traffic flow through the adjustment of traffic signal timings and the introduction of traffic signal efficiency technology.	LBE	(Short/ Long-term)	Medium	Medium	4	* Requires focus on hot spots of poorest air quality	
5	Co-ordinate street works to reduce delays and disruption.	LBE	(Short/ Long-term)	Low	Medium	6	* Requires focus on hot spots of poorest air quality	
6	Work with TfL to improve strategic roads, particularly the A406 North Circular.	LBE	(Short/ Long-term)	Medium	Medium	4		
7	Improve key junctions on the A1055 and other strategic routes.	LBE	(Short/ Long-term)	Medium	Medium	4		
8	Introduce and enforce proportionate waiting and loading restrictions.	LBE	(Short/ Long-term)	Medium	Medium	4		

Detailed transport options – Cycling and Walking							
9	Continue to provide road safety education and training for pedestrians and cyclists of all ages.	LBE	(Short/ Long-term)	Low	Low	3	Uptake can help to reduce congestion.
10	With the health services, undertake local promotional and marketing campaigns and events to encourage people to walk and cycle more.	LBE/ NHS	(Short/ Long-term)	Low	Low	3	Encourages physical activity to help reduce obesity levels and sickness
11	Increase the cycling network to eliminate gaps and ensure continuity, plus increase access, essential services, employment opportunities, green spaces and leisure services.	LBE	(Short/ Long-term)	Low	Low	3	Helps to reduce congestion
12	Work with businesses to promote and support the development of Travel Plans and take up of the Cycle to Work Guarantee.	LBE/ Other	(Short/ Long-term)	Low	Low	3	Helps promote sustainable development (Cycle to Work is a Dept of Transport scheme)
13	Working with the Lee Valley Regional Park Authority to improve facilities and infrastructure for cycles and pedestrians.	LBE/ Other	(Short/ Long-term)	Low	Low	3	Helps promote sustainable development
14	Standardise, improve and update walking and cycling route signing, provision of maps, lighting, and disabled access on the pedestrian network.	LBE	(Short/ Long-term)	Low	Low	3	Improve physical well being and access
15	Develop a high quality network of 'Greenway' cycle and walking routes using parks, open spaces, quiet traffic routes, and 20mph zones.	LBE	(Short/ Long-term)	Low	Low	3	Improve physical well being
16	Increase provision of secure and sufficient cycle parking in major centres, at or within easy reach of every public building and cycling generator.	LBE	(Short/ Long-term)	Low	Low	3	Helps to reduce congestion

Detailed trans	sport options – Parking						
17	Review CPZ coverage on a regular basis and consult with residents over local needs in areas with high levels of parking stress.	LBE	(Short- term)	Low	Low	3	(CPZ = controlled Parking Zone)
18	Improve management of parking better to reduce congestion; improve safety; and ensure a turnover of spaces to help maintain the viability of town centres.	LBE	(Short- term)	Low	Low	3	
19	Prioritise enforcement to achieve our parking management aims.	LBE	(Short/ Long-term)	Low	Low	3	
Detailed trans	sport options – Buses						
20	Improve bus reliability and journey times with new bus priority measures.	LBE	(Short/ Long-term)	Medium	Medium	4	
21	Lobby for new services in areas with poor public transport and plan for new services in areas to support future growth.	LBE	(Short/ Long-term)	Low	Medium	6	
22	Lobby for the introduction of low emission vehicles and fuel in hot spots of poorest air quality.	LBE	(Short/ Long-term)	Low	Medium	6	* Requires focus on hot spots of poorest air quality
Detailed trans	port options – Schools						
23	Encourage the creation of an environment in and around schools, which promotes sustainable travel through the provision of safer routes.	LBE	(Short/ Long-term)	Low	Low	3	
24	Establish "Road Rangers" in primary schools to promote road safety and sustainable travel to school.	LBE	(Short/ Long-term)	Low	Medium	6	
25	Make cycle training to national standards freely available to all school age pupils.	LBE	(Short/ Long-term)	Low	Low	3	
26	Improve cycle routes to schools and support initiatives in school to motivate children to take up cycling.	LBE	(Short/ Long-term)	Low	Low	3	

Detailed options – Other Measures							
27	Implement a scheme promoting public awareness of the Enfield AQMA using signage and information where appropriate.	LBE	(Short- term)	Medium	High	6	Sets example of good practice
28	Promote green travel plans via planning agreements and other liaison with businesses. The Council will normally require major new developments to adopt a Travel Plan as a condition of planning permission.	LBE	(Short/ Medium - term)	Low	Medium	6	Helps to reduce congestion
29	Support the expansion of car clubs and encourage their use of ultra low carbon vehicles.	LBE	(Medium - term)	Low	Low	3	Other parties can also instigate.
30	If it can be proven that proposals for development are likely to significantly increase traffic flows, and thereby significantly increase NO ₂ within the Enfield AQMA, then the Council, as Planning Authority, will refuse planning permission.	LBE	(Short/ Medium - term)	Low	High	9	This is an on going action
31	Conditions will be imposed on any new residential development within the AQMA to mitigate the impact of poor air quality.	LBE	(Short/ Medium - term)	Low	High	9	May be additional costs for development
32	Plant trees along streets to improve the urban environment.	LBE	(Short/ Medium - term)	Low	Low	3	
Carbon Mana	gement Plan Transport Measures						
33	Promote the use of lower carbon modes and eco-driving practices.	LBE	(Short/ Medium - term)	Low	Low	3	Reduces carbon emissions
34	Install publicly accessible electronic charging points at key locations.	LBE	(Medium - term)	Low	Low	3	
Non Transpor	t Related Measures						
35	The Council will seek to maintain and where appropriate increase its air quality monitoring in and around the Enfield AQMA.	LBE	(Short - term)	Medium	High	6	This is an on going action

36	Continued enforcement of industrial emissions by the Council to ensure compliance with the Pollution Prevention Control Act (Part A2 and B installations).	LBE	(Short - term)	Low	Low	3	Reduces other air pollutants. Ongoing statutory action.
37	Continued enforcement by the Council of emissions to ensure compliance with Clean Air Act 1993.	LBE	(Short - term)	Low	Low	3	Reduces other air pollutants. Ongoing statutory action.
38	Continued enforcement by the Council of statutory nuisances that give rise to emissions in contravention of Environmental Protection Act 1990 (Part 3).	LBE	(Short - term)	Low	Low	3	Reduces other air pollutants. Ongoing statutory action.
39	The Council will promote the Best Practice Guidance on "The control of dust and emissions from construction and demolition" (produced by London Councils) to seek to ensure that building contractors minimise emissions.	LBE	(Short/ Medium - term)	Low	Medium	6	Reduces dust and other emissions
40	The Council will undertake a programme of improvements to Council buildings to improve insulation and environmental building controls, and reduce carbon emissions.	LBE	(Short/ Medium - term)	Medium	Low	Not applicable	Part of the Carbon Management Plan

8.4 Prioritisation of Air Quality Actions

The air quality actions as outlined have been prioritised for implementation according to various measures, including the basis of existing actions and budgets, overall costs and cost effectiveness.

Clearly some of proposed actions require greater action and involvement than others. It is therefore expected that the greatest priority for action will be driven by air quality considerations. Namely on the basis of both the air quality within the AQMA, allied with the extent of "relevant exposure" (as outlined within government's LAQM guidance).

The monitoring undertaken by the Council will determine the quality of air within the Enfield AQMA and the extent by which the government's objective is exceeded; this will also be supplemented by the modelled base case predictions where appropriate.

9. Consultation and stakeholder engagement

9.1 Introduction

The revised Enfield Air Quality Action Plan is intended to be an evolving plan that will further develop in time. It will be the subject on going consultation by stakeholders and others.

9.2 Stakeholder involvement

Initial formulation has been undertaken within Enfield Council. Further consultation will be undertaken with others for feedback.

In addition many of the actions in the Air Quality Action Plan have already been the subject of separate intensive consultation, e.g. those relating to the Council's planning, transport and environmental policy and processes. We also regularly meet with local voluntary groups and the Enfield Partnership. This stakeholder engagement will continue throughout the life of the Air Quality Action Plan.

9.3 Council decision making

The Council's Vision for Enfield of Fairness for All, Growth and Sustainability and Strong Communities has already been outlined and this underlines the Council's commitment to sustainable development in the Borough. This Air Quality Action Plan will be the subject of Council approval. Regular annual progress reports will be issued through the Council's standard reporting mechanisms outlining and updating Air Quality Action Plan progress.

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Glossary

Appendix 1

Dellastent	Obj	Date to be	
Pollutant	Concentration	Measured as	achieved by
Benzene	16.25 μg m ⁻³	Running Annual Mean	31 Dec 2003
	5 μg m °	Annual Mean	31 Dec 2010
1, 3 Butadiene	2.25 μg m ⁻³	Running Annual Mean	31 Dec 2003
Carbon Monoxide	10 mg m ⁻³	Daily Maximum Running 8 hour mean	31 Dec 2003
Load	0.5 μg m ⁻³	Annual Mean	31 Dec 2003
	0.25 μg m ⁻³	Annual Mean	31 Dec 2008
Nitrogen Dioxide	200 μg m ⁻³ not to be exceeded more than 18 times a year	1 hour mean	31 Dec 2005
	40 μg m ⁻³	Annual Mean	31 Dec 2005
Particles (PM ₁₀)	50 μg m ⁻³ not to be exceeded more than 35 times a year	24 hour mean	31 Dec 2004
	40 μg m ⁻³	Annual Mean	31 Dec 2004
	350 μg m ⁻³ not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
Sulphur Dioxide	125 μg m ⁻³ not to be exceeded more than3 times a year	24 hour mean	31 Dec 2004
	266 μg m ⁻³ not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005

Carbon monoxide (CO) is a colourless and odourless gas produced by the burning of fuels. Exposure to CO leads to a decreased uptake of oxygen by the lungs and can lead to a range of symptoms as the concentration increases. Early symptoms of exposure include tiredness, drowsiness, headache, pains in the chest and sometimes stomach upsets. Some people, for example those with heart disease, are at an increased risk. Exposure to very high concentrations will lead to death. However such conditions, where there are very high concentrations, are most likely to arise in confined spaces, rather than outdoors where the public are exposed and the air quality strategy (AQS) applies.

Benzene at normal ambient temperatures occurs as a liquid, but it readily evaporates and small amounts are detectable in the air. It is known from workplace studies that benzene is potentially carcinogenic, that is, exposure to it may lead to the development of cancer. The Government's Expert Panel on Air Quality Standards (EPAQS) considered that the risks associated with the levels found in the air in the UK to be small and not be measurable with any accuracy (EPAQS, 1994). Nevertheless, it considered that efforts continue to be made to reduce the levels even further as a precautionary measure.

1,3 Butadiene arises from the combustion of petroleum products and its manufacture and use in the chemical industry. It is not present in petrol but is formed as a by-product of combustion. It is also present in tobacco smoke, which is an important indoor source. EPAQS examined that the adverse effects of 1,3-butadiene on human health and concluded that it was a genotoxic human carcinogen (that is, it is able to cause cancer by damaging genetic material in cells).

Lead in particulate form in air can be inhaled directly by people and ingested indirectly following its deposition on soil and crops. Exposure to lead has been known to be harmful to people for many years, with severe adverse effects on the blood, the nervous system and the kidneys (although these effects only occur with high exposures). More subtle effects caused by lower exposure to lead can also arise, such as may occur from the presence of lead in drinking water, paint and dust, and in the ambient air. These effects include the impaired intellectual development of children. EPAQS concluded that the available evidence suggests that the risks associated with the levels found in the air in the UK are very small and cannot be measured with any accuracy (EPAQS, 1998). However, efforts to reduce the levels even further continue as a precautionary measure.

Nitrogen dioxide (NO₂) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce NO_x emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health. At high concentrations NO₂ causes inflammation of the lung. Long-term exposure is also considered to affect lung function and exposure to NO₂ is particularly important for people with asthma and related diseases. NO_x is also important in the formation of ozone and secondary particle formation.

Sulphur dioxide (SO₂) is a colourless gas, produced from burning fossil fuels like coal and oil. Power stations and oil refineries are the main sources in the UK, with small releases from other industries. SO₂ is also found naturally in the air at low concentrations from natural releases such as volcanoes and forest fires. SO₂ also has role in the formation of secondary particles. SO₂ can cause breathing difficulties at high concentrations over short periods of time, particularly to those with asthma and chronic lung disease. As a result the AQS objectives are all incident based.

PM₁₀ (particles measuring 10µm or less aerodynamic diameter) represent those particles likely to be inhaled by humans, accepting that the chemical and physical composition varies widely. In view of this there is a wide range of emission sources that contribute to PM₁₀ concentrations in the UK. Research studies have confirmed that these sources can be divided into 3 main categories (APEG): (i) Primary particle emissions derived directly from combustion sources, including road traffic, power generation, industrial processes etc. (ii) Secondary particles formed by chemical reactions in the atmosphere, comprising principally of sulphates and nitrates. (iii) Coarse particles comprising emissions from a wide range of sources, including re-suspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles. Particles are associated with a range of health effects, including effects on respiratory and cardiovascular systems, asthma and mortality. As a result, EPAQS recommended a daily standard based on the evidence reviewed with an annual mean standard to assist with policy formation.

Appendix 2

Table 8 Automatic NO_2 monitoring of annual mean concentrations in the Enfield AQMA (2008 to 2010)

		Data	Annual mea	n concentrat	tions (µg m⁻³)			
Site Name	Location	capture 2010 %	2008	2009	2010			
Bush Hill Park (1) <i>(Closed)</i>	Agricola Place Bush Hill Park (Background)	N/A	31	N/A	N/A			
Nightingale Road (3) <i>(Closed)</i>	Salisbury School Nightingale Road (Background)	N/A	30	N/A	N/A			
Derby Road (4)	Derby Road Edmonton (Roadside)	99	45	47	46			
Bowes Road (5)	Bowes Primary Bowes Road (Roadside)	79	59	54	54			

Table 9 Bias adjusted NO₂ diffusion tube monitoring in the Enfield AQMA (2008 to 2010) (μ g m⁻³)

(Notes - bold indicates exceeds AQS objective; sites shown are those with > 75% data capture only)

Site	Туре	2008	2009	2010
Enfield 1	Urban background	44	34	42
Enfield 2	Industrial	38	31	35
Enfield 3	Urban background	35	22	26
Enfield 4	Urban background	28	24	27
Enfield 5	Urban background	39	35	36
Enfield 6	Urban background	23	18	21
Enfield 7	Roadside	35	30	38
Enfield 8	Roadside	49	44	48
Enfield 9	Roadside	49	49	54

Site Name	Location	OS Grid Ref	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
Enfield 1	Sterling Way Edmonton	533659, 192376	Y (5m)	7m	Y
Enfield 2	Centenary Road Brimsdown	536634, 196356	Ν	N/A	Y
Enfield 3	Agricola Place Bush Hill Park	533881, 195832	Y (4m)	8m	Y
Enfield 4	Conway Road Palmers Green	530349, 193283	Y (6m)	6m	Y
Enfield 5	Glynn Road Enfield	535126, 196295	Y (1m)	5m	Y
Enfield 6	Claremont Road Hadley Wood	526449, 198404	Y (1m)	8m	Y
Enfield 7	Bullsmoor Lane Enfield Lock	535460, 199849	Y (6m)	2m	Y
Enfield 8	Derby Road Edmonton	535056, 192470	Y (6m)	2m	Y
Enfield 9	Bowes RoadA406	529893, 192224	Y (1m)	3m	Y

Table 10 Details of diffusion tube monitoring sites in the Enfield (from 2011 Progress Report)

Table 11 Automatic PM_{10} monitoring of annual mean concentrations in the Enfield AQMA (2008 to 2010)

		Data Capture for	Annual mean concentrations $(\mu g m^{-3})$			
Site Name	Location	full calendar year 2010 %	2008	2009	2010	
Nightingale Road (3) (Closed)	Salisbury School Nightingale Road	N/A	18	N/A	N/A	
Derby Road (4)	Derby Road Edmonton	86	29	27	28	
Bowes Road (5) (FDMS)	Bowes Primary Bowes Road	46	22	26	26	

Table 12 Automatic PM_{10} monitoring for number of days exceeding 50 µg m⁻³ in the Enfield AQMA (2008 to 2010) (Bold indicates greater than UK AQS objective)

		Data Capture for	No. of daily means > 50 μg m ⁻³ (90%ile in brackets)			
Site Name	Location	full calendar year 2010 %	2008	2009	2010	
Nightingale Road (3) (Closed)	Salisbury School Nightingale Road	N/A	1	N/A	N/A	
Derby Road (4)	Derby Road Edmonton	86	39	11	12 (60)	
Bowes Road (5) (FDMS)	Bowes Primary Bowes Road	46	1	16	4 (52)	