



Air Quality and Planning Guidance

Revised version- January 2007

**Written by:
The London Air Pollution Planning and the Local Environment
(APPLE) working group**

London Councils Air Quality and Planning Guidance

1. Introduction

1.1 Purpose of the guidance

This guidance is aimed at developers, their consultants and local authorities. It revises previous guidance issued in 2001 and provides technical advice on how to deal with planning applications that could have an impact on air quality. If developers and local authorities follow the procedures in this guidance, it will help ensure consistency in the approach to dealing with air quality and planning in London. This revised guidance was endorsed by the London Councils Transport and Environment Committee (TEC) on 17th October 2007.

The recent Government draft Air Quality Expert Group (AQEG) *Air Quality and Climate Change* report recognises the potential for both local and global air quality improvements. Local authorities will be looking towards reductions in both and developers should take this into account throughout the design, construction and operational phases of a development, bearing in mind any potential trade-offs between global and local air quality improvements.

1.2 Background

Clean air is vital to human health. High levels of fine particulate (PM₁₀) air pollution in 2005 were estimated to have caused 1,031 accelerated deaths and 1,088 respiratory hospital admissions in London¹.

The Government adopted the UK Air Quality Strategy (AQS) in 1997, to deal with local air quality and its impact on health. This was revised as the AQS for England, Wales, Scotland and Northern Ireland in 2000, which set requirements for local authorities to undertake a process of Local Air Quality Management (LAQM). As part of this process, local authorities must review and assess air quality and work towards objectives to be achieved between 2003 and 2010. Where the prescribed air quality objectives are unlikely to be met, local authorities must designate Air Quality Management Areas (AQMAs) and produce an Air Quality Action Plan setting out measures they intend to take to work towards objectives. Under the requirements of the Greater London Authority Act 1999, the Mayor of London produced an Air Quality Strategy in 2002 setting out how the National Strategy will be implemented in London as a whole. London borough Action Plans need to have regard to this strategy.

By 2006, all but one borough has declared AQMA(s) for nitrogen dioxide (NO₂) and/or PM₁₀. The major cause of air pollution in London is road traffic, although around Heathrow Airport, emissions from aircraft and associated site traffic are an additional problem. Other notable contributions come from industrial plant and premises, domestic energy production, and construction activity. It should be remembered that background pollutant concentrations in London and the South East are heavily influenced by weather systems that also affect northern Europe.

A consultation on the review of the National AQS was issued in April 2006. The Government is proposing an 'exposure reduction' approach in line with the proposed EU Thematic Strategy. This approach supplements air quality objectives (which are focused at hot-spots) to achieve a general reduction in pollution concentrations in urban areas across the whole

¹ The Mayor's Air Quality Strategy: Progress report to March 2005.

country. Any changes in the National AQS will be reflected in future borough Review and Assessment, and policy work.

A key principle of LAQM is for local authorities to integrate air quality considerations with other policy areas, such as planning. The recent Planning Policy Statement 23 (PPS23) on Planning and Pollution Control clearly states that air quality can be a material planning consideration. Indeed, PPS23 goes on to state that the planning system should not just seek to maintain the 'environmental status quo', rather "*planning should become a more strategic, proactive force for economic, social and environmental well-being*"². It goes on to say "*The planning system plays a key role in protecting and improving the natural environment, public health and safety, and amenity*"³. It is therefore important for all local authorities to think about how they can best bring air quality considerations into the planning process at the earliest possible stage and it is no longer satisfactory to simply demonstrate that a development is no worse than the existing or previous land use on a particular site.

Where developments take place in an AQMA, mitigation measures should be considered as standard practice, particularly in cases where the development is new and does not replace an existing use. This is especially important where the development has provision for a large number of parking spaces, significantly increasing the number of trips, and/or heating plant.

This guidance takes into account new planning policies, including PPS23, and aims to help reduce exposure to air pollution across the whole of London. This approach should bring health benefits to everyone - not just those living in localised areas (i.e., hotspots) where the objectives are exceeded. This is particularly important for PM₁₀, as this pollutant has a significant impact on health and has no safe threshold. In order to reduce overall exposure, background pollution will need to be reduced, so it makes sense that every development that has the potential to emit pollution should require mitigation or offsetting to help achieve an overall reduction in London's air pollution.

This technical guidance has been produced by the APPLE (Air Pollution Planning and the Local Environment) working group. The document updates and replaces the ALG⁴ Planning Technical Guidance issued on 20th March 2001 and Circular TEC 01/03.

² PPS23 Planning and Pollution Control, ODPM 2004, para. 3.

³ *ibid*, para. 9.

⁴ London Councils was formerly known as the Association of London Government (ALG). Its new name, effective from 1 October 2006, was chosen to reflect more accurately its membership.

2. Air quality assessments for planning applications

2.1 Introduction

Where air quality impact assessments are required as part of a planning application, guidance is often sought by the applicant as how best to undertake these to the satisfaction of the local authority. This document sets out situations when an assessment may be required and suggests methods for undertaking such an assessment within the London area. It is based on situations unique to London and on the experience of London local authorities.

Once an air quality assessment has been completed, the local authority will make a judgement on whether the proposed development is likely to significantly affect air quality or if it is located in an area of poor air quality. If a development is determined to result in a deterioration of air quality, the local authority will often work with the developer to offset this impact by securing mitigation measures that will allow the development to progress. Similarly, if a development is of sensitive use and located in an area of poor air quality, the local authority will work with the developer to ensure all measures are taken to secure acceptable air quality for new receptors.

London local authorities have typically used similar assessment methods to each other to fulfil the requirements of the detailed Review and Assessment process that led to the AQMA designation. For consistency, air quality impact assessments for developments within London should, where possible, follow similar methodologies. Applicants intending to undertake an air quality assessment should always seek the latest information available on air quality and pollutants of concern from the appropriate borough(s). Guidance on the use of air quality assessment applications is available in the Department for the Environmental, Food and Rural Affairs (Defra) *Technical Guidance Note LAQM.TG(03)*.

Appendix 3: Air Quality Assessment Toolkit, provides details of the information that is likely to be agreed with a local authority Air Quality Officer prior to an Air Quality Assessment being undertaken. It is hoped that this checklist will cut out ‘consultation fatigue’ between developers, or their agents, and local authority officers.

2.2 Developments that require an air quality assessment

The overall outcome of an air quality assessment is to determine whether the development will have a significant impact on air quality or whether the existing air quality environment is unacceptable for the proposed development.

The three main ways a development may have a significant impact are:

1. If the development is likely to cause a deterioration in local air quality (i.e., once completed it will increase pollutant concentrations)
2. If the development is located in an area of poor air quality (i.e., it will expose future occupiers to unacceptable pollutant concentrations)
3. If the demolition/construction phase will have a significant impact on the local environment (e.g., through fugitive dust and exhaust emissions). [Note the proposed London-wide Best Practice Guidance entitled *The Control of Dust and Emissions from Construction and demolition* should help reduce emissions from this stage of a development.

The Environmental Impact Assessment (EIA) process is likely to require a detailed study of the effects of a development on air quality, particularly where a development is to take place in the urban environment or in an AQMA. In such cases, the approach set out in this guidance note should be followed. Most proposals for commercial or industrial installations

that have the potential to emit pollution (e.g., ‘Part A’ installations) will also normally require an air quality assessment under the EIA regulations⁵. Small industries, such as ‘Part B’ installations, may still require an assessment as part of a permit application under the Pollution Prevention and Control (PPC) regime⁶, as too would waste handling activities⁷, and the same assessment can often be used to help determine the impact of the development in terms of air quality for a planning application. If for whatever reason planning permission is being sought in the absence of an assessment having been carried out for a permit application or similar, then local authorities should require one to be submitted.

There are likely to be many other situations where developments that do not require a full EIA will nevertheless warrant an air quality assessment as part of the planning application. Developers should always check with the local authority to determine whether an air quality assessment is required before submitting a planning application.

Where it is clear from the initial specification of the development that it is likely that the development will have a minimal impact on air quality, but an air quality assessment may still be required (e.g., within an AQMA), developers may wish to consider identifying air quality mitigation measures from the start as part of the development, instead of undertaking a full air quality assessment. This course of action is at the discretion of the local authority Air Quality Officer, and so it is important that communication between developers, or their consultants, and the local authority takes place at an early stage of the decision making process. This does not apply to applications where an EIA under the town and country planning regulatory regime is required.

When considering issues of relevant exposure it is advisable to refer to the ongoing borough Review and Assessment, carried out as part of the Local Air Quality Management duties, specified by the Environment Act 1995. Also, wherever possible, air quality assessments should be carried out so as to allow comparison with a borough Review and Assessment.

Key Points:

Local authorities will consider the following issues when determining whether an air quality assessment should normally be undertaken:

- Locality of development – including relevant exposure;
- Length of time and scale of demolition/construction phase;
- Likely increase in traffic levels from existing base (either through servicing or parking requirements);
- New industrial development (e.g., boiler plant/energy production/permitted installations/authorised processes);
- Size of development - residential/commercial floor space or number of units;
- Street canyons and stationary or queuing traffic;
- Increase in HDV movements (e.g., more than 20 per day), such as for lorry parks, depots, bus stations;
- New rail, road building and signalling, bridge, tunnel, port or airport developments;
- Waste handling activities.

Note: This list is not exhaustive and other factors may determine that, in the local authority’s opinion, an air quality assessment is required.

⁵ The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999, SI 293/1999.

⁶ The Pollution Prevention and Control (England and Wales) Regulations 2000, SI 1973/2000.

⁷ Waste Management Licensing (England and Wales) Regulations 1994 (as amended).

2.3 General principles of air quality assessments

There are two primary factors that impact upon the AQ assessment of a proposed development:

- **Site suitability:** it should be recognised that a development in an area that is already exceeding AQ limits could have a detrimental impact upon its residents;
- **Impact of development:** the impact of the development on the environment needs to be detailed. An air quality impact assessment should clearly indicate the likely change in pollutant concentrations (relevant to the air quality objectives⁸) arising from the proposed development– during both the construction and operational phases. The assessment must consider the *difference* in air quality as a result of the proposed development.

There is no single, definitive method for carrying out a detailed air quality impact assessment, but the method must be appropriate for the development. For some developments screening models may be acceptable, provided they can be demonstrated to work and are suitable for the urban environment. Where a detailed dispersion modelling is required, developers should consult the local authority's air quality officer about the proposed modelling technique, to ensure it is appropriate for the air quality assessment.

Consistency is important in all air quality assessments and this guidance note is particularly concerned with air quality assessments where dispersion models are to be used. The scope for inconsistency is greater due to the range of different possible model inputs in such situations.

Where practicable, air quality assessments should take into account the cumulative air quality impacts of other developments, both within the authority and neighbouring boroughs. These should include both committed developments (i.e., those proposals that have been granted planning permission at the time the assessment is undertaken), as well as other proposals which planning officers consider are likely to proceed. This will ensure that a realistic scenario of air quality in the AQMA is presented for both the 'baseline' and 'with development' predictions of the air quality impact of the development.

The granting of outline planning permission should follow the precautionary principle. In the case of high-risk developments a full EIA is likely to be required, therefore the information provided should be the same as that of a full planning application. However, where a development is seen as a lower risk, outline planning permission may be granted. Local authorities should ensure that suitable planning conditions are attached to the outline planning permission requiring further consideration to be given to environmental issues at a later stage, before detailed permissions is granted. This issue is dealt with in further detail in Annex 1 of PPS23: Pollution Control, Air and Water Quality.

⁸ The Air Quality (England) (Amendment) Regulations 2002, SI 3043/2002.

Key Points:

An air quality assessment must demonstrate how a development would affect pollution concentrations in relation to health based statutory and proposed air quality standards and objectives.

This would normally involve dispersion modelling to:

- Assess the current air quality situation in the locality;
- Estimate emissions of local air pollutants from the development;
- Predict statistics relevant to the air quality objectives *without* the development in place relative to the year of opening and air quality objectives (EU Limits year 2010 or relevant EU limit years)- the baseline scenario;
- Predict statistics relevant to the air quality objectives *with* the development in place in the same years;
- The cumulative impact of developments should be considered.

Modelled baseline scenarios should also be checked against the local authority's predicted baseline scenarios, to ensure that they broadly agree. If not, the predicted pollutant concentrations, without development, might show an exceedance of air quality objectives where a local authority's Review and Assessment did not, or vice-versa; full explanations should be given for differences in modelling approached and assumptions. The factor of greatest importance would be the *difference* in air quality associated with the proposed development compared to the baseline.

2.4 Choosing a dispersion model

Dispersion models should be used in almost all cases for large developments, or those developments proposed in areas where air quality is approaching or exceeding the relevant standards or objectives. Defra guidance *LAQM.TG (03)*⁹ suggests models that can be used for air quality assessments— it could be beneficial to confirm the selection of the model with the local authority. The model should be capable of taking into account all relevant emission sources within London, for example; line (major road) and area (minor road, domestic heating, individual boilers, commercial etc.) sources. The application should also be able to include point sources (i.e., chimney stacks) from nearby industrial sources. Where relevant the model should be able to determine the effect of height on air pollutant concentrations, if relevant for the planning application under consideration.

2.5 Model input data

The assessment should provide a transparent account of the modelling undertaken, all assumptions made and input data used. The local authority may request an audit of the assessment, in which case the developer must provide any extra appropriate data requested.

2.5.1 Emissions data

The Greater London Authority (GLA) has responsibility to compile an atmospheric emissions inventory for London. This inventory is annually updated using best available data and is used as the basis for all London local authorities' air quality Review and Assessment reports.

The most recent version of the London Atmospheric Emissions Inventory (LAEI) should be used for an air quality assessment within London, unless significantly better data are

⁹ LAQM Technical Guidance. LAQM.TG (03), Defra 2003.

available. Developers can obtain this inventory directly from the GLA Air Quality Team¹⁰. Road traffic emission factors are incorporated into the LAEI but can also be obtained from the Emission Factor Toolkit (v2e)¹¹. Comparison should be made with monitoring data from Defra's Automatic Urban and Rural Network or the London Air Quality Network where appropriate¹².

If other emission data is needed for specific situations, such as more recent emission factors on idling, slow speeds or cold starts, they should be shown to be consistent with those used in this inventory; further information can be sort sought from the GLA or local authority.

Except for situations where a distant major source has a significant effect on pollution levels in the area of interest, only major roads and stacks in the vicinity of the development need be included explicitly. The study should take into account the proposed model output area, which may include nearby sensitive receptors and other local hot spots of concern to the local authority.

Background air pollution can be accounted for by using urban background data from a nearby monitoring station where the data is sufficiently relevant to the study area. However, care should be taken to avoid double counting emissions if the urban background concentrations are used.

Distant major sources within London should be included within aggregated grid sources and must be included when using rural background data. Where a model is unable to include all emissions sources across London in this manner, it should be demonstrated that the omission of these sources does not affect the model results. Minor roads in the immediate vicinity, which are congested or show large increases in traffic and which have been included in the transport assessment, should also be modelled.

Further information on emissions and atmospheric emissions inventories, can be found in the Defra's technical guidance document *LAQM.TG (03)*.

2.5.2 Time-varying emissions

Traffic flows and speeds, and hence emissions, vary throughout the day; if appropriate emissions from vehicles should vary within the model, by time of day and by day of week. Where possible, time-varying traffic movements should be based on local information, for instance a local network of automatic traffic counters (ATCs). This information is most applicable for assessments looking at short-term objectives.

The additional density of emissions that occurs during traffic congestion needs to be properly addressed in the assessment. This is particularly important where that proposed development is likely to result in increased congestion or increased queue length. For industrial processes, these should be modelled to vary in time as would be expected by the authorisation or permit.

2.5.3 Supplementary traffic data

Where a transport assessment (TA) has been prepared for a proposed development, modelled or predicted development traffic flows in the TA should generally be used as the

¹⁰ GLA Air Quality contact: 020 7983 4492.

¹¹ Emission Factor Toolkit (v2e) currently available from http://www.casellastanger.com/modelling_helpdesk/subjects/emission_factors_toolkit.asp

¹² The Mayor's AQ Strategy. September 2002.

basis for the calculation of 'with development' emissions and subsequent model runs. **Before an air quality assessment based on a TA is undertaken, the TA should be approved by the local authority's traffic planners, in consultation with their air quality officers.** If this does not happen, developers risk undertaking an air quality assessment on the basis of traffic proposals that may subsequently change, risking the assessment becoming obsolete. Through liaising with traffic engineers and dispersion model users, it is usually possible to obtain traffic data in a suitable format to perform an emissions calculation.

Where the proposed development is likely to result in additional congested traffic conditions, the TA will need to provide sufficient information to quantify the times when queuing around junctions is likely to occur. Particular care should be taken in selecting appropriate traffic speeds.

2.5.4 Weather data

The format required will depend on the model to be used, and should be checked with the supplier of the dispersion model.

Key Points:

- Weather data should be taken from an appropriate and representative site with a full dataset;
- At least one year of hourly-sequential data should be used;
- In adopting a precautionary approach, it is currently recommended that suitable 'worst-case' MET year be used, as well as a 'typical' MET year.

2.5.5 Model specific data

Depending on the model used and the area in question, there are many parameters that should be agreed prior to modelling being undertaken.

Key Points:

These might include:

- Site surface roughness length (typically 1m to 2m in London);
- Minimum Monin-Obukhov length (certain models only);
- The number and dimensions of any street canyons (streets where pollutant dispersal is adversely affected by surrounding buildings);
- Release height of aggregated sources (grid or volume sources).

2.5.6 Background pollution data

Pollution can be carried into London or into the modelled area from non-local sources. If this is smaller than the whole of the London area, it must be taken into account. Validated and ratified monitoring data should be taken from an appropriate background site or from the National Air Quality Archive¹³, background emissions data can also be gathered from the National Atmospheric Emissions Inventory database¹⁴, in most cases the same year as the

¹³ <http://www.airquality.co.uk/archive/laqm/laqm.php>

¹⁴ <http://www.airquality.co.uk/archive/laqm/laqm.php>

weather data will be used; however, there may be occasions when data from different years may be appropriate. The developer should agree in advance with the local authority's Air Quality Officer which background data should be used.

2.6 Pollutant-specific concerns

If a development is expected to alter traffic flows, PM₁₀ and NO₂ would normally be modelled, since widespread exceedences of these pollutants are predicted across much of London, and motor vehicles are a significant source of each. If the development is itself a significant emitter, pollutants relevant to the type of development need to be taken into account (for instance, SO₂ and NO₂ should be considered for an oil-burning process or benzene from a petrol station or refinery).

The results for local air pollutants should be compared against air quality objectives. Any likely exceedences or worsening of air quality as a result of the development must be highlighted.

Local Concerns

2.6.1 Nitrogen dioxide (NO₂)

NO₂ is derived from NO_x (oxides of nitrogen) via a series of complex chemical reactions. An empirical method or a chemistry scheme may be used to derive NO₂ from NO_x.

Key Points:

- All inputs relevant to the chosen chemistry scheme or a NO_x:NO₂ conversion scheme should be used (see LAQM.TG(03)) and detailed in the report;
- The model's NO_x outputs should be shown. A full table of outputs should be shown in the appendix, identifying road contributions, adjusted road contributions and total concentrations. The details of the verification process should also be included.

2.6.2 Fine particles (PM₁₀)

The objective for PM₁₀ is based on a gravimetric measurement. Any PM₁₀ modelling study should present results as a *gravimetric equivalent*. Projection of PM₁₀ for future years should follow the Defra guidance LAQM.TG (03).

Key Issues:

- PM₁₀ should be calculated as a gravimetric equivalent;
- Secondary and coarse PM₁₀ components should be included.

2.6.3 Sulphur Dioxide (SO₂)

The objective for SO₂ that is likely to be hardest to meet is the 15-minute objective.

Key Points:

- The assessment should demonstrate that the modelling methodology provides a reasonable assessment against the 15-minute and 1 hour objectives.

2.6.4 Other pollutants

There are other local air pollutants (including those not in the Air Quality Regulations) that may also be relevant to specific developments. The developer should check with the local authority to determine whether they need to consider the implications of other pollutants or take into account any new air quality objectives. Other pollutants could include:

- Carbon monoxide (CO)
- PAH (poly aromatic hydrocarbons)
- PM_{2.5}
- Heavy metals
- Benzene
- Industrial pollutants eg dioxins, halides
- Ozone (O₃)

Global concerns

2.6.5 Climate Change Emissions

Although these pollutants are not included in the Air Quality Regulations for Local Air Quality Management, they are of global importance for their contribution to climate change. Many policies that reduce traffic flow will tend to bring about reductions in both carbon dioxide (CO₂) and local air pollutants. However, although these pollutants are closely linked, it cannot be assumed that this will be the case for all measures¹⁵. Therefore, it is important to consider total CO₂ emissions alongside an air quality assessment (both local and remote emissions).

The integration of climate change policies with the planning process is a progressive move, and it is recognised that local authorities are at different stages of incorporating climate change policies into their general practices. The development of Local Implementation Plans, setting out how London borough's are going to implement the Mayor's Transport Strategy, should take into account Air Quality Action Plans, and will facilitate this process; typically incorporating developments which lead to an increase in traffic generation.

2.6.6 Estimating Climate Change Emissions

A planning application should give details, in its air quality assessment, where the design, construction and operation of the development has accounted for reductions in Climate Change emissions. Any potential 'trade-off' issues between local air quality and climate change emissions should be acknowledged within the assessment.

CO₂ emissions from sources such as traffic and buildings can be estimated from the London Atmospheric Emission Inventory. Such data may be useful to a borough when considering off-setting the impact of development.

¹⁵ AQEG. Air quality and climate change: A UK perspective (draft)

2.7 Model output area

The output results should cover the area likely to be affected by the proposed development. For a development that affects traffic movements, the output should cover the area where traffic movement is significantly affected, i.e., as a minimum all the roads included in the transport assessment.

The results produced would normally be in the form of a detailed contour plot of predicted pollutant concentrations and scale of air quality change. A map showing predicted concentrations with the development in place and a map of the *difference* in concentration with and without the development should both be produced. Ideally, the grid spacing for any contour plots should not be more than 5 metres, to ensure robust definition.

In certain cases it may be acceptable for the assessment to predict concentrations at a number of carefully selected receptors. The developer should agree the output area, location and number of receptors in advance with the local authority. All receptors should be presented on an appropriately scaled Ordnance Survey map.

In the case of tall buildings, developers may need to consider the vertical as well as the horizontal dispersion of pollutants in terms of model outputs. Developers should consider the surrounding environment of the development - any high level point sources, such as chimney stacks or ventilation outlets, should be identified to ensure that the proposed development does not encroach upon the plume dispersion. This is vital with the increase in high-rise developments within London. Developers should therefore take into account any research, emerging studies or guidance on this matter¹⁶. The Building Research Establishment (BRE) has produced reports concerning the dispersion of pollutants over a building envelope.

Authorities may require source apportionment data in order to evaluate mitigation and off-set strategies.

Key Points:

- The area affected by the development should be adequately covered by the model output;
- The output should be on an Ordnance Survey map or similar and in a table;
- Maps of the difference with and without the development should be provided where possible;
- Locations and height of receptors should be clearly indicated (on the map);
- The assessment should consider whether the development will create new areas of exposure or increase existing exposure;
- The difference in concentration should be given in $\mu\text{g}/\text{m}^3$;
- The cumulative impact of multiple developments within a localised area should be considered.

2.8 Model Verification

Because of the number of uncertainties associated with dispersion modelling, the performance of the model being used in relation to measured pollution concentrations in a similar environment should be demonstrated. For air quality assessments in London, it should be demonstrated as a minimum that the model can adequately predict pollution concentrations in a similar urban environment, preferably within the borough where the development is proposed, since model performance may vary from location to location.

¹⁶ Also see DAPPLE research project <http://www.dapple.org.uk/>

Where the model is used to predict statistics relevant to the air quality objectives (such as percentiles), the evidence of model performance should also address this. Evidence of this should either be incorporated into the report, or submitted with it.

Wherever possible, it is preferable to verify the model against measured pollution concentrations using the same input parameters as for the air quality assessment. Within London, there are many continuous monitoring sites that may be used to validate a modelling exercise. Sites within London are normally associated with the Automatic Urban and Rural Network (AURN)¹⁷ or the London Air Quality Network (LAQN)¹⁸, but the local authority may collect its own data from a nearby air pollution monitoring station; this can also be used for any necessary validation work. For a more complete description of the approach to the verification of a model please see *LAQM.TG(03)*.

Key Points:

- Evidence of model performance must be provided (e.g., with the release of the version of the model used) or where possible from a new site-specific validation exercise;
- The accuracy in terms of margin of error or uncertainty of the results must be stated explicitly;
- Any scaling factor applied to model outputs (e.g., to adjust results according to observed data) must be clearly stated;
- The model's effectiveness at predicting statistics relevant to the air quality objectives must be demonstrated.

2.9 Determining significant impacts on air quality

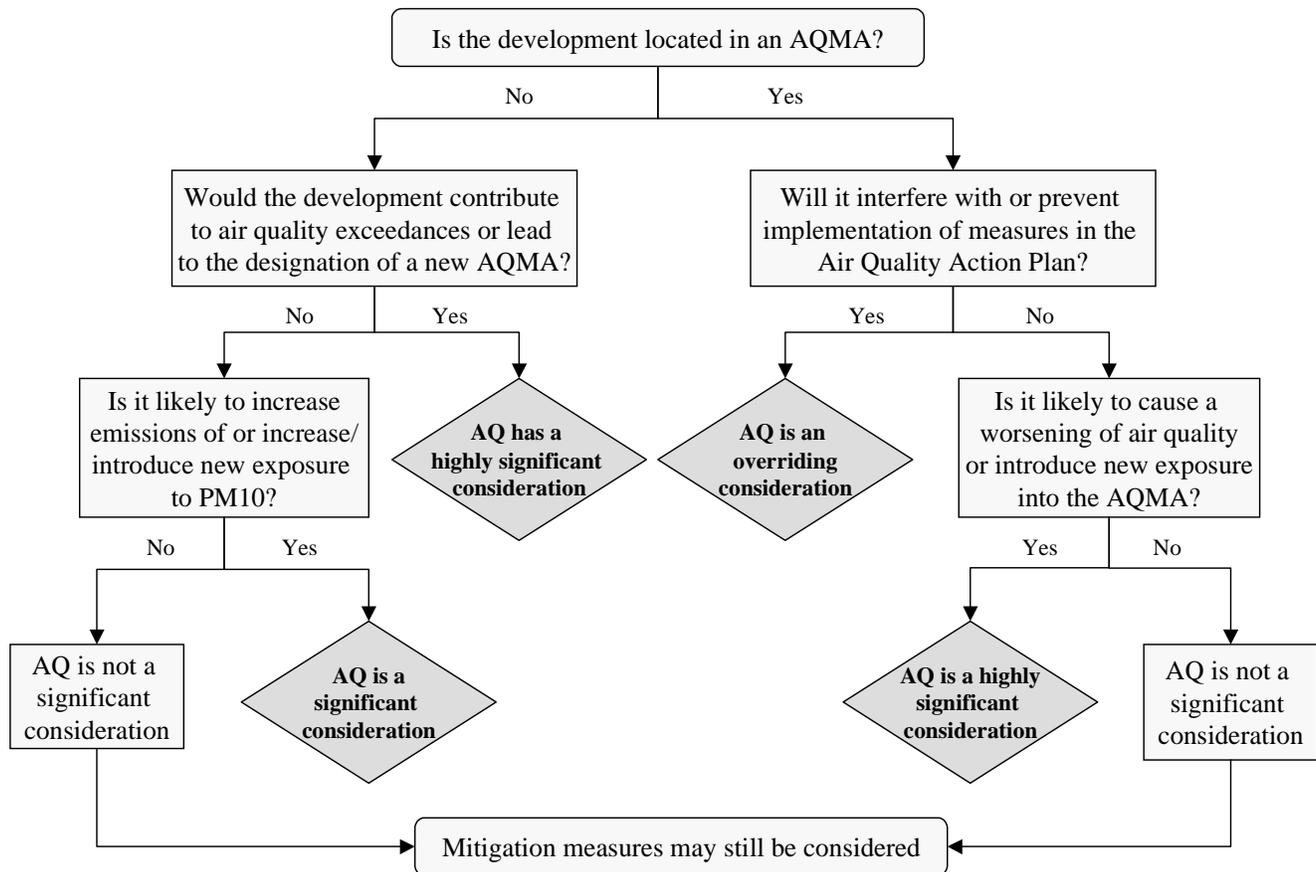
One of the key concerns with regard to assessing the air quality impact of a development in London is its impact on human health. It is important that an air quality assessment evaluates modelled air quality in terms of changes in pollution concentrations where there is relevant public exposure. The current Air Quality Regulations are concerned with areas that exceed air quality objectives but this may be revised to favour overall exposure reduction. This guidance follows this approach, where any development that may lead to additional air pollution problems, even if it is outside an AQMA, could be significant. Local Authority Air Quality Officers will make a judgement on the likely impact of each development, based on the results of the air quality assessment and their professional experience. The local authority may also consider the impact of the development on air quality in neighbouring authorities.

The following diagram should assist in determining whether the application is significant in terms of air quality. In line with PPS23, air quality can be a material consideration in the planning process. **Only zero-emission developments are unlikely to have any impact on local or global air quality** and therefore mitigation should be a consideration for **all** developments. Please refer to **Section 3** on Mitigation.

¹⁷ <http://www.airquality.co.uk>

¹⁸ <http://www.londonair.org.uk>

Determining significant impacts on air quality



Note: Where **significant** is used, it will be based on the professional judgement of the Local Authority officer.

In determining both the significance of exposure to air pollution and the levels of mitigation required, consideration should be given to the following Air Pollution Exposure Criteria (APEC) table:

	Applicable Range Nitrogen Dioxide Annual Mean	Applicable Range PM10	Recommendation
APEC – A	> 5% below national objective	Annual Mean: > 5% below national objective 24 hr: > 1-day less than national objective	No air quality grounds for refusal; however mitigation of any emissions should be considered.
APEC – B	Between 5% below or above national objective	Annual Mean: Between 5% above or below national objective 24 hr: Between 1-day above or below national objective.	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g., Maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised.
APEC – C	> 5% above national objective	Annual Mean: > 5% above national objective 24 hr: > 1-day more than national objective.	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.

Note: Applicable ranges assume downward pollutant trend has been established.

2.10 Reporting the Assessment

In summary, the following information should be provided as a minimum when reporting an air quality assessment:

- **A description of the methodology used**
- **Evidence of model performance or validation results**
- **Details of any extra emissions calculations**
- **Input data- sources included, input parameters specific to the model and site, meteorology etc**
- **Years modelled**
- **Assessment against relevant air quality objectives**
- **Model output data, on maps where appropriate**
- **Discussion of results**
- **Determination of significance**
- **Conclusions**

2.11 Audit trail

The assessment should provide a transparent account of the modelling undertaken and all assumptions made. Should an audit of the assessment be required, the local authority may request extra data.

3. Mitigation of air quality impacts

This guidance has been designed to help local authorities to identify those developments that are likely to have significant air quality impacts. The local authority will make recommendations based on the assessment result in the flow chart, but it is not the case that all those where air quality is an overriding or highly significant consideration is necessarily refused. Instead, local authorities should work with developers to explore mechanisms to ensure that a development has a beneficial impact on the environment. In terms of air quality, this may be through careful design of the development or by securing mitigation or off-setting measures through planning obligations or conditions that will allow the development to go ahead.

3.1 Construction phase

Emissions and dust from the demolition and construction phase of a development can have a significant impact on local air quality, especially from large developments where this phase can take many years. The APPLE working group has produced draft Best Practice Guidance entitled: *The Control of Dust and Emissions from Construction and Demolition* that looks at best practical means to control dust and emissions from construction sites. This guidance is due to be adopted in partnership between London Councils and the Mayor of London in 2006, and boroughs will be able to use this in the planning process to help minimise the impact from fugitive dust emissions and vehicle exhausts.

3.2 Design of the development

The design of the development will have a bearing on the overall impact that it will have on the environment. The Mayor's London Plan identifies that suitable design and construction constraints have to be placed on developments to ensure the protection of the local air quality, and every effort should be taken to achieve an integrated approach to air quality and emission reductions through improved energy efficiency and energy use¹⁹.

Careful consideration should be given to the site characteristics of the development, as particular elements of a scheme may be more sensitive to air pollution than others, for example a children's play space should be located away from roads with high levels of air pollution. The appropriate design, layout, orientation and construction can avoid increasing exposure whilst minimising energy demand and energy loss. Further details of design approaches can be found in the Mayor of London's Sustainable Design and Construction Supplementary Planning Guidance (SPG).

The local authority should consider issues such as ventilation provision and location of opening windows and doors to improve indoor air quality. In the case of tall buildings, mixed use can help make development acceptable by, for example, placing residential use on higher storeys away from sources of air pollution (and noise) at ground level, allowing for balconies and open-able windows, while lower floors can accommodate commercial uses where mechanical ventilation and windows that cannot be opened are more acceptable. The use of outside space is also important, and roof gardens and roof terraces have been encouraged by the Mayor²⁰. However, exposure levels should still be considered; with the location of the roof terrace (height of open space), and adjacent roof exhausts and intake vents, all being factors that can impact upon the exposure levels at these open spaces.

¹⁹ The London Plan: Spatial Development Strategy for Greater London. February 2004. pg162.

²⁰ Living Roofs: Promoting green roofs, roof terraces and roof gardens across London. GLA. June 2005.

3.3 Building emissions

The Mayor of London's SPG on Sustainable Design and Construction highlights the impacts that buildings can have on the local and global environment. An estimated 20% of NO_x in London is emitted directly from buildings. In addition, buildings contribute an estimated 24% of the total CO₂ emissions directly contributing to climate change. Together with the Mayor's London Plan, the SPG presents a number of requirements that developers should meet, where possible, including the following:

3.3.1 Energy efficiency

Part L of the Building Regulations identifies the legal minimum a development needs to meet in terms of energy efficiency in the UK. However, in London developers should look to meet more stringent demands that have been set by the Mayor in the London Plan, with the overarching aim of reducing CO₂ emissions, improving energy efficiency and increasing the proportion of energy generated from renewable sources. Many of these options will have direct synergies with the improvement of local air quality.

A development may increase local pollutant concentrations whilst making a positive impact in other areas. For example, a CHP plant serving 1000 dwellings will give rise to increased pollutant concentrations from a single point source. However, there are potential trade-offs with the removal of 1000 less efficient, individual boilers. Methods to reduce the impacts of large-scale CHP need to be planned into a development at an early stage. These include:

- using a fuel suitable for the location (gas produces lower emissions than oil or wood);
- correctly calculating the height of boiler flues;
- incorporating technologies that reduce emissions, such as low NO_x burners and fan dilution;
- ensuring the energy from the installation is fully utilised.

Consideration of the net balance of emissions may be more appropriate in such a case rather than just considering local pollutant emissions in isolation.

3.3.2 Renewable energy

The Mayor's London Plan requires 10%²¹ of energy demand in new development to be generated by renewables on site. A large number of boroughs have set a 10% proportion of energy to be supplied from renewable sources, and some boroughs are seeking even higher renewable energy contributions. There are a number of different energy options and technologies available, and developers should select the most favorable technology to bring about the greatest reduction in CO₂ emissions. Details and guidance of available techniques and their suitability can be found in the Mayor's Energy Strategy and London Renewable's publication: *Integrating renewable energy into new developments: Toolkit for planners, developers and consultants*²².

3.3.3 Supply of energy

Developers should consider supplying energy schemes such as tri-generation combined heat and power (CHP), or district heating from the outset. These are more efficient at reducing

²¹ At the time of writing, the Mayor's *Draft further alterations to the London Plan*, published on 29th September 2006, have increased this target to 20%- however, this is still only as yet a draft target.

²² http://www.london.gov.uk/mayor/environment/energy/docs/renewables_toolkit.pdf

emissions than installing gas central heating or condensing boilers in each dwelling, and can lead to reduced emissions of local air pollutants and CO₂.

Developers need to consider how dwellings will remain cool once they are occupied. Air conditioning can put additional strains on energy consumption and should be considered as a last resort. Air conditioning can be designed out by the use of well designed passive ventilation, sensible building orientation and using materials with a high thermal mass. Renewable energy sources should always be used in association with any air conditioning installation.

3.4 Planning Conditions

In Annex 1 of PPS23, it is stated that there may be some cases where it is appropriate to use planning conditions to control aspects of a development that are not covered by a pollution permit. Examples include controlling transport modes, hours of operation and reducing air pollutants and dust from certain phases of the development, such as construction. A planning condition has to be necessary and relevant to the development to be valid. Further advice can be found in Government Circular 11/95.

3.5 Planning obligations

Annex 1 of PPS23 also describes how section 106 agreements can be used to require developers to provide assistance or support to enable local authorities to implement any actions in pursuit of their Air Quality Action Plan. Typically, measures will focus on ways to reduce the need to travel or encourage more sustainable travel, but it may often be appropriate for developers to fund measures elsewhere within the AQMA as a way to off-set any predicted increases in pollutant emissions. The following are examples of measures that London local authorities have successfully secured in the past through section 106 agreements. Further advice can be found in Government Circular 05/2005.

3.5.1 Travel Plans

All new developments should make provisions to encourage cycling and walking and wherever possible, seek submission of Travel Plans that encourage staff and visitors to use more sustainable modes of transport rather than rely on car use. Car parking should be discouraged within AQMAs, particularly for developments located near to public transport. Measures in a Travel Plan need to produce quantifiable emission benefits and ideally an element of monitoring should be included in the agreement.²³

The Trip Rate Assessment Valid for London (TRAVL) database is a useful tool to assist in estimating the effect of proposed changes in land use on transport patterns. In addition, TRAVL also contains a Travel Plan monitoring and assessment function, enabling the effectiveness of individual travel plans to be compared over time and with other sites²⁴

Examples of individual measures within a Travel Plan include:

- Secure cycle parking and changing facilities;
- Safe pedestrian routes;
- Facilities for public transport, such as bus stops and lay-bys;

²³ Further information can be obtained from <http://www.travl.org.uk>

- Management and use of parking spaces, so that priority is given to certain categories of people, e.g., disabled people, people with children, visitors, or cars with more than one occupant, electric or low emission vehicles;
- The removal of parking spaces after a specified period, or when access to the site is improved (e.g., new public transport routes, cycle lanes);
- Car free housing developments;
- The provision of information on public transport, walking and cycling access to the site;
- Details on deliveries to the site, covering specification of vehicles and hours of operation, and specifications for lorry parking and turning spaces; and junction and road layouts;
- Employment of a travel plan co-ordinator for the site with responsibility for monitoring;
- Setting targets on the proportion of employee trips to be made by public transport and other alternative modes of transport;
- Setting up or participating in City Car Clubs for residents or employers.

3.5.2 Use of clean/alternatively fuelled vehicles

Promoting the provision of refuelling for alternative fuels such as liquid petroleum gas, liquefied/compressed natural gas or biogas at local fuel stations, encouraging suitable locations for new refuelling facilities, or installing electric vehicle charging points in car parks, can all encourage people to use cleaner-fuelled vehicles. Site operators or occupiers can be required to use clean fuel fleets or restrictions can be placed on them to use specific classes and types of vehicles. They can also be required to monitor the maintenance and carry out emissions testing of the fleet.

3.5.3 Low Emission Schemes and Strategies

All reasonable means to minimise emissions from a scheme should be adopted. Measures may include using opportunities to regulate vehicle emissions, either in relation to European Emission Standards or CO₂ emissions, in line with Vehicle Excise Duty Bandings. Consideration should be given to both incentives and disincentives to influence vehicle emissions in both commercial and residential usage. A more holistic approach would consider all types of emissions from a development and there may be opportunities to off-set vehicle emissions with energy emissions and vice versa.

3.5.4 Air quality monitoring

Section 106 agreements can be secured to require the operator or occupier to monitor emissions or concentrations of pollutants at off site locations. London local authorities have also secured section 106 agreements to require developers to contribute to their borough wide air quality monitoring programmes. In these cases, capital funding may be sought for the purchase, installation, operation or maintenance of new equipment.

3.5.5 Other

A local authority can ask for appropriate funds through the section 106 process for any reasonable measure that can help them improve air quality. This means there will be other opportunities to improve air quality that are not highlighted above.

Appendix 1: The Planning Context

Guidance relevant to local planning authority's air quality responsibilities is set out in the following planning policy guidance:

National and London Planning Guidance

Planning Obligations Circular 05/05

This replaces Circular 1/97 and provides revised guidance to local authorities on the use of planning obligations under section 106 of the Town and Country Planning Act 1990 as substituted by the Planning and Compensation Act 91.

Planning Conditions Circular 11/95

This circular sets out guidance on the use of planning conditions for situations that can enhance the quality of the development. Conditions need to be fair, reasonable and practical and meet the tests set out in this document.

PPS23: Planning and Pollution Control (2004)

This document has recently been revised to include requirements under the Environment Act 1995 and states that pollution issues must be taken into account as appropriate planning decisions. In terms of air quality, Annex 1 paragraphs 1.48-1.50 set out how planning conditions or obligations can be used to address the impact of the proposed development on air quality. Appendix 1G gives examples of cases where air quality may be important in planning.

PPG6: Town Centres and Retail Developments (1996), PPG12 Development Plans (2000) and PPG13 Transport (1999)

PPG 6 and PPG12 deal with air quality indirectly by promoting sustainable forms of development i.e., development in locations such as town centres that are well served by public transport in order to reduce traffic generation and emissions. Draft revised PPG13 emphasises the importance of local air quality as an "important consideration in the integration of planning and transport" (paragraph 9). It also states the importance of well-designed traffic management as a measure to reduce local air pollution.

Mayor of London- The London Plan: Spatial Development Strategy for Greater London (2004) and Air Quality Strategy (2002)

The Mayor of London is responsible for strategic planning in London, and his London Plan replaces strategic guidance RPG3. Borough's development plans must conform to the plan. Policy 4A.6 on Improving Air Quality sets out that the Mayor and boroughs should implement the Mayor's Air Quality Strategy to achieve reductions in pollution emissions in the new developments. For example:

- Improving the integration of land use and transport policy by reducing the need for car travel;
- Setting out criteria for different pollutants, against which plans and policies can be assessed;
- Ensuring that air quality is taken into account as a material consideration at the planning application stage.

Policy Guidance LAQM.PG(03), Defra (Department for Environment, Food and Rural Affairs)

This guidance has a chapter on Air Quality and Land Use Planning that states "Any air quality consideration is capable of being a material planning consideration, in so far as it affects land use". The guidance also states "All planning applications should be supported by such information as is necessary to allow a full consideration of the impact of the proposal on the air quality of the area".

NSCA guidance Development Control: Planning for Air Quality

This national guidance was published in 2004 to provide a framework for air quality considerations that need to be taken into account in the development control process. The guidance provides a new approach to addressing air quality impacts compared to previous documents, such as the ALG Planning Technical Guidance issued in 2001.

Local Planning Policy

In London, the major cause of air pollution is road traffic. Although many measures to solve this problem are outside the scope of planning, such as stricter controls on vehicle emissions, there is much local planning authorities can do. The planning policy response should concentrate on policies to reduce the need to travel and policies to encourage the use of public transport, walking and cycling. There should be close co-operation between Planners, Traffic engineers and Environmental Health Officers to integrate land use and transport policies to achieve air quality improvements.

Unitary Development Plans (UDP), Local Implementation Plans (LIP) and Local Development Frameworks

Relevant policies in these documents need to integrate reducing travel with reference to local air quality management. Examples of such policies include introducing low emission or clear zones that limit vehicles entering areas unless they comply with specified emissions limits.

Air Quality Policies

A specific policy on Air Quality Management Areas could be included in the local authorities' development plans. Policies on air quality should make clear that any development being proposed that is potentially polluting e.g., will significantly increase the number of vehicle trips, involve polluting industrial activities, energy generation projects etc. will need a detailed air quality assessment.

Restrictive Parking Policies

Policies that impose restrictive parking standards in areas where development is likely to impact on air quality and lead to exceedences within the AQMA, particularly promoting car free or car 'capped' housing developments could be adopted. Converting existing off-street car parking spaces and car parks to other uses should also be encouraged.

Supplementary Planning Guidance and Planning briefs

For each Air Quality Management Area, Supplementary Planning Guidance notes could be adopted requiring any specific local matters relevant to the development of land. Any planning brief produced for development of land in an Air Quality Management Area should address in detail issues of air quality and how the development will be designed to minimise air pollution from the development. Many Local authorities will have specific AQ SPGs or Sustainable Design and Construction SPGs, which will be relevant to this document.

Appendix 2: References

- Development Control: Planning for Air Quality (Guidance from NSCA on dealing with air quality concerns within the development control process) NSCA 2004
- Use of conditions in planning permission. Circular 11/95. ODPM. 1995
- **LAQM.PG (03)** Policy Guidance (code PB7516), Defra 2003
- **LAQM.TG (03)** Technical Guidance (code PB7514), Defra 2003
- Mayor of London. Air Quality Strategy: Cleaning London's Air. 2002
- Mayor of London. London Plan: Spatial Development Strategy for Greater London. 2004
- **PPG4** *Industrial and Commercial Development and Small Firms* (ISBN 0 11 752723 8), DOE 1992
- **PPG6** *Town Centres and Retail Developments* (ISBN 0 11 753294 0), DOE 1996
- **PPG12** *Development Plans* (ISBN 1 85112 349 0), DETR 1999
- **PPG13** *Transport* (March 2001)
- Planning Obligations Circular 05/2005, ODPM 2005
- **PPS23** *Planning and Pollution Control* (ISBN 0117539317), ODPM 2004

Appendix 3: Air Quality Assessment Toolkit

Throughout this Guidance the importance of communication between Local Authority officers and Developments, or their consultants has been shown. It is hoped that this Toolkit will clearly indicate what information is required to satisfactorily complete an AQ Assessment and what information needs to be agreed prior to the assessment taking place.

Stage 1: *What information should initially be provided to the local authority in order to determine if there is a need for an Air Quality Assessment.*

Locality of development	<p>Definition of spatial scope, including identification of all relevant exposure.</p> <p>Is the site located in and Air Quality Management Area, or will it impact upon an Air Quality Management Area?</p>
Traffic Assessment	Local Authority Traffic Planners/Engineers should advise, in consultation with Air Quality officers, what is required for the traffic impact assessment?
Nature of development	The number of units proposed or commercial floor space.
Parking spaces	The number of parking spaces that are proposed.
Energy usage	The planned source of energy and number of appliances; CHP, individual boilers etc.
Committed developments	Agreement with local planning authority, regarding further developments that should be taken into account.
Road Access	Will there be any alteration to the access roads, or road layouts as result of the development.

Stage 2: If after the information supplied above indicates that an AQ Assessment is required the following information will have to be agreed prior to the AQ assessment taking place.

<i>What models are to be used?</i>	Identify what screening and assessment model is to be used, need to be informed the model was selected and why it's appropriate.
<i>Emissions</i>	Identify appropriate emissions inventory, if not LAEI an explanation of reasons will have to be provided.
<i>Traffic Speeds</i>	What traffic scenarios are to be used for the assessment, identify any changes to traffic flow as a result of the development.
<i>Traffic Congestion</i>	As above, local data can be gathered from local authority traffic assessments
<i>Weather Data</i>	Suitable nearest site should be used for Met data, a worst case scenario and typical Met year should be provided.
<i>Background Source Data</i>	Suitable data should be selected in consultation with the local authority.
<i>Pollutants to be modelled</i>	What pollutants are required to be modelled, taking into account the end use and local environment.
<i>Agreement on model output</i>	Single receptors and/or Gridded output? Grid size?
<i>How will the model be verified</i>	Comparison against recent locally collected data.
<i>Assessment of construction and demolition dust</i>	Identification of risk. Proposed mitigation.