



Derivation of Screening Criteria for Review and Assessment of Airports – 2008 Update

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1 Introduction

- 1.1 Technical Guidance Note LAQM.TG(03) was published by Defra in February 2003. The principal aim of LAQM.TG(03) was to provide detailed technical guidance to local authorities in carrying out their duties under the Environment Act 1995 and subsequent Regulations. These duties require local authorities to review and assess air quality in their area from time to time.
- 1.2 The review and assessment process is built upon a phased approach. The intent is that local authorities should only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded. The first stage of the review and assessment process is an Updating and Screening Assessment (USA). Where the outcome of the USA identifies a significant risk of an air quality objective being exceeded, the authority is required to undertake a Detailed Assessment (DA).
- 1.3 A number of screening tools were provided in LAQM.TG(03) to assist local authorities in carrying out their USA's. These included various nomograms, as well as threshold criteria below which sources could be discounted.
- 1.4 For airports, threshold screening criteria were devised for both nitrogen dioxide and PM₁₀. The LAQM.TG(03) guidance recommended that authorities only need consider moving to a Detailed Assessment if the following conditions are met:
 - For nitrogen dioxide – airports that exceed 5 million passengers per annum (mppa) or equivalent and/or where the NO_x background exceeds 25 µg/m³;
 - For PM₁₀ - airports where there is relevant exposure within 500 m of the airport boundary and where the airport passenger throughput exceeds 10 mppa.
- 1.5 For both nitrogen dioxide and PM₁₀, these threshold criteria only relate to “airport sources” and it was recognised that airport-related road-traffic impacts would need to be considered separately.
- 1.6 Since the publication of LAQM.TG(03), additional information related to the air quality impacts of airport operations has become available, and it is now appropriate to review these threshold criteria in light of this new information. This will help formulate the updated guidance to be published in LAQM.TG(08).

2 Derivation of the LAQM.TG(03) Criteria

- 2.1 The screening criteria derived for the LAQM.TG(03) guidance were largely based on the outcome of sensitivity tests carried out for the SERAS and RASCO studies, which were used to support the Aviation White Paper. By definition, these studies had to incorporate a range of generic assumptions. In addition, there was evidence at the time that the modelling approach applied was over-estimating the airport contribution by a factor of 2 or more.
- 2.2 For the TG(03) guidance it was concluded that in general terms a 5 mppa airport could contribute up to a maximum of about $25 \mu\text{g}/\text{m}^3$ NO_x at the closest likely receptor, depending upon the relative alignments of the airport sources and the prevailing wind direction. Assuming that the background concentration did not exceed $25 \mu\text{g}/\text{m}^3$, this would generate a total NO_x concentration of $50 \mu\text{g}/\text{m}^3$, providing an additional element of headroom below the NO_x concentration of around 75-80 $\mu\text{g}/\text{m}^3$ above which the objective ($40 \mu\text{g}/\text{m}^3$ NO₂) might be exceeded.
- 2.3 The screening threshold was therefore set at a very conservative level, but this was deemed appropriate at the time, as it needed to be applicable to a wide range of airports with differing characteristics, and was based on limited data.

3 Outcome of More Recent Studies

- 3.1 It is now quite widely accepted that airports are not significant sources of PM₁₀ emissions, and this is supported by monitoring data around the UK's major airports at Heathrow, Gatwick and Stansted. There is therefore no need for local authorities to review and assess with regard to PM₁₀.
- 3.2 Since the publication of LAQM.TG(03) there have been a number of airport studies carried out that provide additional information on the likely NO_x contribution of airport source emissions. These include the detailed studies that were undertaken by DfT as part of the Project for the Sustainable Development of Heathrow (PSDH), as well as various published Environmental Statements and local authority review and assessment reports.
- 3.3 The outcome of these studies is summarised in Table 1 below, with the results shown graphically in Figure 1. The maximum annual mean NO_x concentrations attributed to emissions from airport

sources only, i.e. aircraft and airside traffic, at worst-case off-site locations, are shown as a function of the airport size, measured by the number of passengers per annum. The NO_x contributions from airport-related sources, such as car parks, access roads, and the local road network are not included in these data.

Table 1: Summary of maximum annual mean NO_x concentrations associated with airport source emissions.

Airport	mppa	Maximum NO _x (µg/m ³)	Source
Bournemouth	1.25	2.9	Assessment of Potential Air Quality Impacts on vegetation from the Proposed New Terminal at BIA. Air Quality Consultants (2005)
	3	3.3	Passenger Terminal Expansion and Refurbishment (2007). Available at www.bournemouthairport.com .
London City Airport	3.9	8.6	Interim Application. Air Quality Consultants (2007)
Stansted	18.6	21.3	Generation 1 Environmental Statement, Volume 3 Air Quality, BAA Stansted (2006)
Gatwick	38	40	Further Assessment (Stage 4) of the Horley Air Quality Management Area – 2010 Addendum. Reigate & Bansted BC. February 2005
Heathrow	65	35 ^a	Project for the Sustainable Development of Heathrow – Technical Report, DfT (2006)

^a This monitoring site is within the airport boundary, and is thus not strictly representative of the nearest off-site receptor.

- 3.4 Two regression lines have been fitted to these data shown in Figure 1, one including the other excluding the results from Heathrow. The results appear to fit better to the relationship excluding Heathrow. This also represents a worst-case relationship and is thus used as the basis for this guidance. The airport contribution is therefore only likely to exceed 25 µg/m³ where the passenger throughput is 20 mppa or greater, i.e. 4 times higher than had previously been assumed within LAQM.TG(03). To ensure that the assessment is even more precautionary, it is considered appropriate to apply an additional factor of 2, to give 10 mppa as the screening criterion for NO₂.

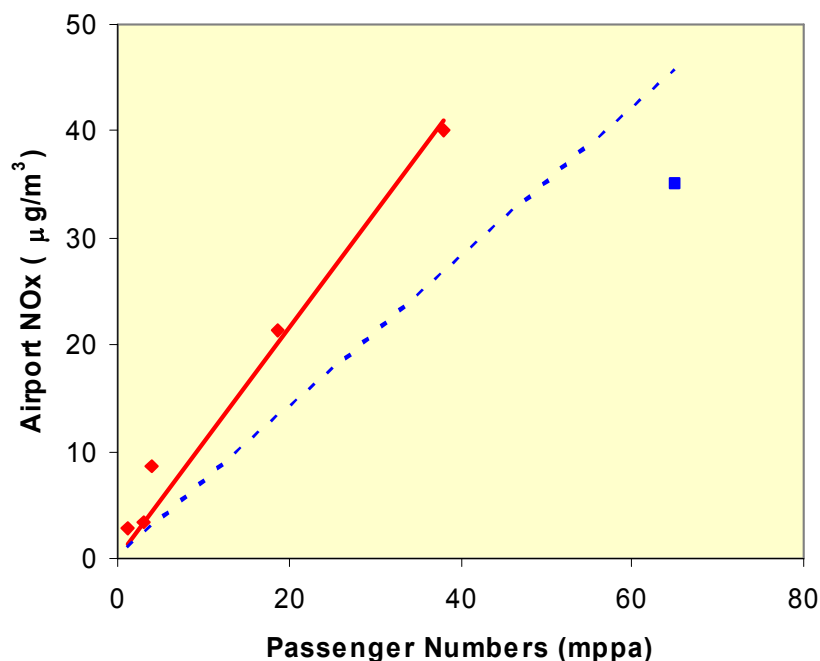


Figure 1: Maximum annual mean NOx concentration associated with airport sources compared with mppa. Solid line = best fit without Heathrow. Dashed line = best fit with Heathrow. Both forced through zero.

4 Recommendations for LAQM.TG(08) Criteria

- 4.1 On the basis of new monitoring and modelling data that have become available since LAQM.TG(03) was published, it is considered appropriate to revise the USA screening criteria that were included at that time.
- 4.2 The requirement for local authorities to review and assess PM₁₀ concentrations for airport operations should be removed.
- 4.3 The screening criteria for nitrogen dioxide should be revised to include airports where the passenger throughput (or equivalent) exceeds 10 mppa or the current annual mean NOx concentration is above 25 µg/m³. With these criteria, all airports exceeding 10 mppa would proceed to a DA, together with any airports with less than 10 mppa, if the background NOx is above 25 µg/m³. These criteria apply to airport sources, and not to the roads serving the airport, which need to be considered separately.

4.4 It is recognised that the analysis of data presented in Section 3 includes receptors that have a range of geographic relationships with respect to airport sources, and there is thus inevitable uncertainty associated with the relationship. However, the revised screening criteria are expected to represent a very conservative approach as:

- A worst case relationship (excluding the Heathrow data) has been selected;
- The screening threshold proposed (10 mppa) represents 50% of the passenger throughput expected to generate $25 \mu\text{g}/\text{m}^3$ NO_x; and
- A $25 \mu\text{g}/\text{m}^3$ contribution (when added to $25 \mu\text{g}/\text{m}^3$ background) would still give a NO_x concentration below the level that would lead to an exceedence of the annual mean objective for nitrogen dioxide.