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Bristol Airport Limited

12 mppa Planning Appeal

New WHO air quality guidelines:
Note for information



Report for

Bristol Airport Limited

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1. Introduction

1.1.1 On 22 September 2021, the World Health Organization (WHO) issued new guidelines¹ on the health effects of air quality on humans. The purpose of this note is to provide a brief overview of these new guidelines and the implications for the Bristol Airport planning appeal.

2. The new guidelines

2.1.1 The new WHO guidelines replace those issued in 2006². The objective is stated as follows:

2.1.2 *"The overall objective of the updated global guidelines is to offer quantitative health-based recommendations for air quality management, expressed as long- or short-term concentrations for a number of key air pollutants. Exceedance of the air quality guideline (AQG) levels is associated with important risks to public health. These guidelines are not legally binding standards; however, they do provide WHO Member States with an evidence-informed tool that they can use to inform legislation and policy. Ultimately, the goal of these guidelines is to provide guidance to help reduce levels of air pollutants in order to decrease the enormous health burden resulting from exposure to air pollution worldwide."*

2.1.3 Specifically, the document includes air quality guideline levels (AQGs), which are defined as:

2.1.4 *"A particular form of a guideline recommendation consisting of a numerical value expressed as a concentration of a pollutant in the air and linked to an averaging time. It is assumed that adverse health effects do not occur or are minimal below this concentration level. For the purposes of this document, a long-term air quality guideline level is defined as the lowest exposure level of an air pollutant above which the guideline development group is confident that there is an increase in adverse health effects; the short-term air quality guideline level is defined as a high percentile of the distribution of daily values, for example the 99th percentiles equivalent to three to four days a year exceeding this value."*

2.1.5 There are new AQGs for the two pollutants of most interest for the Appeal Proposal, namely nitrogen dioxide (NO₂) and fine particulate matter (PM_{2.5}). These are given in Table 2.1, alongside

¹ World Health Organization (2021) WHO global air quality guidelines. Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. <https://apps.who.int/iris/handle/10665/345329>

² CD8.1.

the previous WHO guideline and the English Air Quality Standards (AQS) and Air Quality Objectives (AQOs; AQSs and AQOs are numerically the same).

Table 2.1 Air quality guidelines

Pollutant	New WHO AQG	Previous WHO AQG	AQS/AQO
NO₂ (annual mean)	10 µg m ⁻³	40 µg m ⁻³	40 µg m ⁻³
PM_{2.5} (annual mean)	5 µg m ⁻³	10 µg m ⁻³	25 µg m ⁻³

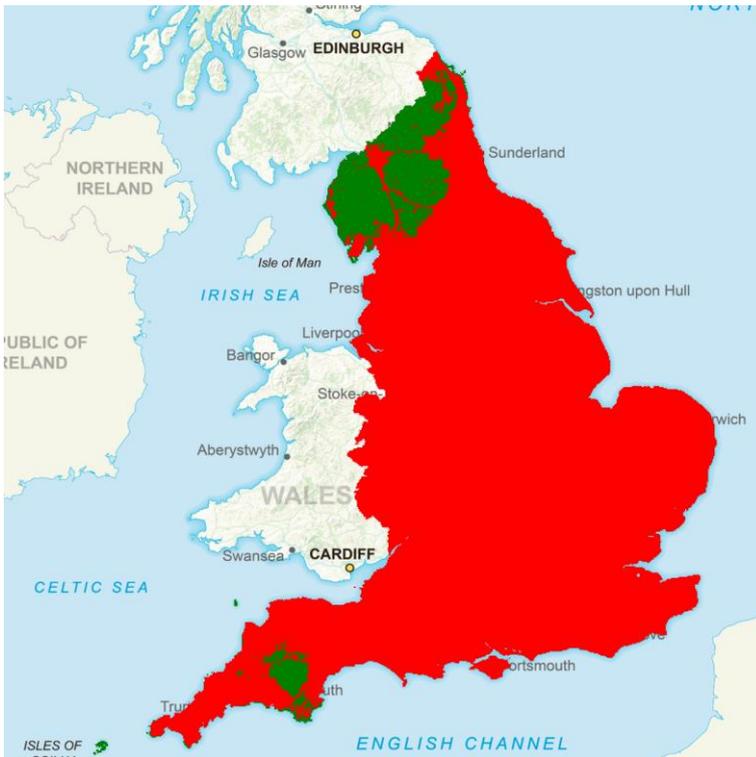
2.1.6 It is clear that the new AQGs are much stricter than the old ones or the AQOs. This is acknowledged by WHO, who note that *"While achievement of the AQG levels should be the ultimate goal of actions to implement the guidelines, this might be a difficult task for many countries and regions struggling with high air pollution levels. Therefore, gradual progress in improving air quality, marked by the achievement of interim targets, should be considered a critical indicator of improving health conditions for populations."*

3. Current and future compliance with the guidelines in England

3.1.1 The new AQGs for PM_{2.5} and NO₂ are much lower than the current AQOs in England. They are not currently met in most of England. According to Defra's background maps (which do not account for local sources of pollution such as major roads, and therefore are expected to show concentrations lower than the actual concentration where there is a local source), the only places in England that currently meet the AQGs for both NO₂ and PM_{2.5} are the most remote parts of the far southwest and the far northwest such as Dartmoor, the Lake District and the north Pennines (Figure 3.1). Even by 2030, compliance for both these pollutants will only be achieved in the most rural parts of England (Figure 3.2). Clearly, meeting the guidelines is a national and international issue.

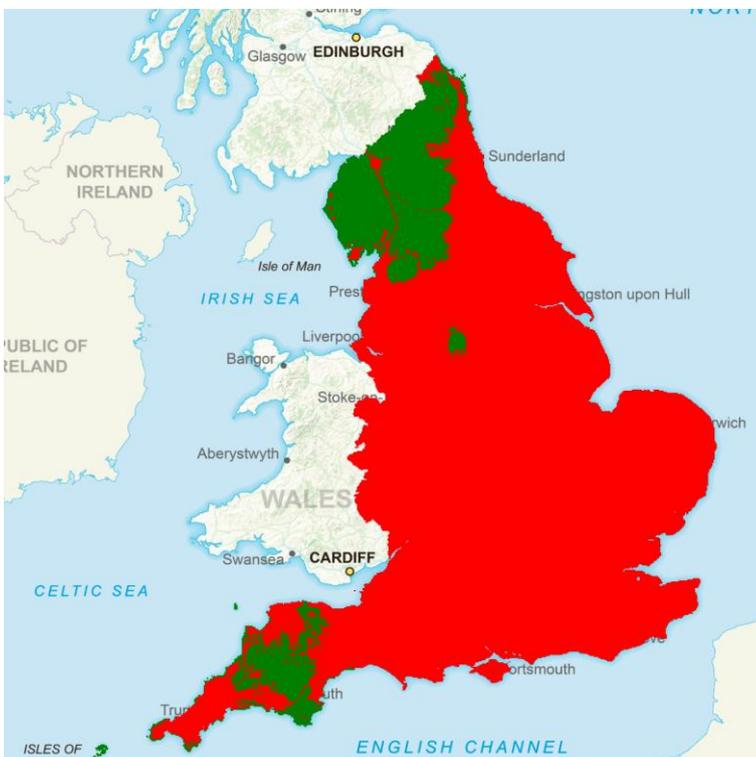
3.1.2 It is likely that compliance could only be achieved by virtually eliminating anthropogenic sources of pollution, which means nearly all combustion sources. This will clearly not be achieved for many years in the UK.

Figure 3.1 Areas in England that meet WHO guidelines for both NO₂ and PM_{2.5}, 2021



Green: AQGs for both NO₂ and PM_{2.5} are met. Red: at least one of the AQGs is not met.

Figure 3.2 Areas in England that meet WHO guidelines for both NO₂ and PM_{2.5}, 2030



Green: AQGs for both NO₂ and PM_{2.5} are met. Red: at least one of the AQGs is not met.

4. Purpose of the guidelines

- 4.1.1 WHO makes clear in its definition, quoted above, that the AQGs are health-based and are essentially the lowest concentrations at which health effects have been observed in studies. WHO discusses how to move from AQGs to legal standards. It states (page 177 et seq):
- 4.1.2 *"[T]he guidelines aim to identify the optimal level of air quality to protect public health in different contexts; they provide a pathway to countries to transform the recommended AQG levels into legally enforceable standards..."*
- 4.1.3 *Air quality standards are the cornerstone of air quality management. Such standards are adopted and enforced by regulatory authorities to define the acceptable level of air pollution for a country or region....*
- 4.1.4 *Air quality standards may be based solely on scientific evidence and public health considerations. However, other features such as legal aspects, cost–benefit or cost–effectiveness may also be examined. In practice, there are generally several opportunities within a legal framework to address economic issues, as well as issues related to technological feasibility, infrastructural measures and sociopolitical considerations. These can be considered during the standard-setting process or when designing appropriate measures to control emissions. This process may result in the establishment of multiple standards, such as an adverse effect-oriented standard as a long-term goal and less stringent interim standards to be achieved within shorter periods of time."*
- 4.1.5 COMEAP make a similar point, in the context of setting air quality targets under the Environment Bill, that:
- 4.1.6 *"the health evidence alone is not sufficient to define the concentration at which targets should be set. Targets could therefore be defined in terms of the costs and benefits of achieving them, if this can be undertaken in a rigorous fashion in time to inform the derivation of targets. This approach would help to ensure that the investment required to meet the air quality targets is proportionate to the benefit gained, and that it would not inappropriately consume resources that could achieve more public benefit if they were invested to address other problems."³*
- 4.1.7 It is clearly not WHO's intention, therefore, that the AQGs should be directly transcribed into legal standards. There is a process to be undergone before suitable standards can be developed, and

³ INQ029, page 12

even if it is the ultimate intention to achieve compliance with the AQG levels, other factors also need to be taken into account.

4.1.8 The situation of national regulatory standards being out of alignment with WHO guideline values is not new. Nor is it new for those considering the implication of such differences to ask what the relationship is between the WHO guideline values and the national regulatory standards. The European Parliament published a report in 2014 considered just this issue⁴. That report made the following observations:

- WHO air quality guideline values have a different role to air quality regulatory standards.
- WHO guidelines are based solely on scientific conclusions about public health aspects of air pollution.
- WHO guidelines do not consider the technical feasibility or the economic (such as cost benefit analysis), political and social aspects of the achievement of these levels.
- The WHO AQG levels can thus be considered as a recommendation.
- In contrast, limit values have to be attained within a given period of time and are not to be exceeded once they have been attained. Noncompliance with the limit values can have legal consequences such as the start of infringement proceedings or lawsuits by citizens against the relevant agencies or administrations.
- Thus the economic, technical, political and social aspects of attaining limit values are taken into account when setting the relevant regulatory standards.

4.1.9 A commonly quoted example where pragmatic reasons meant that regulations were not implemented in strict alignment with the guidelines is that when the current AQS for PM₁₀ was set, a certain number of days were allowed to exceed the limit value, on the grounds that there would inevitably be exceedances on Bonfire Night in the UK.

5. Policy implications

5.1.1 **It is important to note, however, that there is no change to air quality or planning policy in England as a result of the publication of the new guidelines.** All legislation and policy documents refer to specific concentration levels, stated with the relevant documents. These levels

⁴ EU Air Quality Policy and WHO Guideline Values for Health. 2014. European Parliament. Directorate General for Internal Policies. Policy Department A: Economic and Scientific Policy. Pdf page 21, para 2.4.1.
[http://www.europarl.europa.eu/RegData/etudes/STUD/2014/536285/IPOL_STU\(2014\)536285_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2014/536285/IPOL_STU(2014)536285_EN.pdf)

were typically informed by previous WHO guidance, but they do not say or imply that the levels will change if WHO guidance changes. Changes to legislation or policy are not derogated to WHO. Any changes to legislation or policy needs to go through the appropriate processes by UK bodies.

- 5.1.2 While policy or legislation may change in future as a result of the new guidance, at the current time, there have been no such changes, and so **all evidence on policy and legislation previously presented to the inquiry remains valid.**

6. Implications for BAL's case

- 6.1.1 **BAL's position is unchanged by the new guidelines.** Specifically, BAL acknowledges that there will be adverse impacts on air quality, but that these impacts are not significant, as agreed by Dr Broomfield in cross-examination⁵. Moreover, the adverse health effects from air quality impacts need to be considered alongside other impacts of the Proposed Development, including socio-economic impacts. This has been done by Mr Pyper in his evidence, which concluded that *"significant beneficial effects to population health are likely in relation to investment and employment due to the Appeal Proposal... [S]ignificant adverse effects to population health are unlikely."*⁶
- 6.1.2 In its case, NSC places great weight on the point that there are health effects to air quality impacts below the AQOs, for example saying *"the Council will contend that increases in exposure even below air quality objectives increases the risk of harm to health and well-being"*⁷. BAL has always acknowledged that there are likely to be non-threshold health effects, and has taken this into account in its assessment. The guidance from the IAQM/EPUK⁸ was explicitly developed with an awareness of effects below the AQO in mind, so that impacts below the AQO may nonetheless be considered significant⁹. Non-threshold effects were also taken into account within the health assessment for the ES and ESA¹⁰. These non-threshold effects account for the small change in risks to health below the AQO, and even below the previous WHO guidelines. The way the ES and ESA have accounted for non-threshold effects is therefore not changed by the new WHO guidelines. The ES and ESA health assessment gives weight to the UK statutory limit values as the standards for what is currently acceptable in England in terms of air quality related health protection¹¹. As the

⁵ Dr Broomfield, cross examination, Day 14 am session.

⁶ BAL 8.2 page 44 para 6.1.11–6.1.12.

⁷ CD21.2.18 page 22 para 74.

⁸ CD8.6, page 25, Table 6.3 note 6.

⁹ BAL 3.2 page 25 para 5.2.22–5.2.25.

¹⁰ Mr Pyper, Rebuttal (**BAL/W8/3**), pdf page 16, para 2.2.1 to 2.2.10.

¹¹ Mr Pyper, Proof of Evidence, page 28, para 4.3.40 to 4.3.41.

regulatory benchmarks have not changed, the ES and ESA health assessment is therefore unchanged¹².

- 6.1.3 The HIA¹³ methods state that the Government define air quality standards as concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and the environment. These air quality protection measures are produced in the knowledge that particular groups within a population will have particular health vulnerabilities.¹⁴ The HIA methods had regard to the previous WHO guide values but did not hold the proposed development to those WHO guide values where they are more stringent than UK AQOs. This remains the case with the new WHO guide values and reflects the role of the AQOs and that it is right to maintain public confidence in England's health protection standards. Should the AQOs be revised in the future to define new standards of acceptability for air quality in England then those would be the appropriate health protection standards for HIA to benchmark against. Such changes have however not occurred and so it remains correct to reference the air quality legislation currently in force.
- 6.1.4 Public health is not as simple as just the scientific evidence. There are frequent tensions between the emerging scientific evidence and the regulatory or policy positions Governments take. For this reason the HIA methods deliberately seek to triangulate evidence so that these tensions can be acknowledged and a pragmatic consensus reached. The HIA methodology also takes account of local health priorities, baseline conditions, regulatory standards, health policy context and consultation responses. Even with the new WHO position providing scientific evidence for lower levels at which adverse health effects occur from certain air quality pollutants, this does not change the HIA assessment. The HIA has already taken non-threshold effects into account. By definition this is all the way down to zero, i.e. no lower threshold. This is lower than the new WHO guidelines. The HIA also placed such small changes in risk factors into the context of other evidence sources and the UK regulatory regime. Having consulted with Mr Pyper on the issue of the new WHO guidelines, he confirms that the HIA conclusions are not changed by the new WHO guideline values.

¹² BAL 8.2 page 29, para 4.3.40.

¹³ ES (**CD2.5.42**), page 39, para 16.11.10.

¹⁴ Mr Pyper, Proof of Evidence, page 28, para 4.3.40 to 4.3.41.

7. Summary and conclusion

- 7.1.1 WHO has issued new guidelines on air quality. The new guideline levels for NO₂ and PM_{2.5} are considerably stricter than the AQOs.
- 7.1.2 There is no change to the planning context, or to English policy or legislation.
- 7.1.3 BAL's case for this appeal is unchanged. It has always been acknowledged that there may be adverse health effects even at concentrations below the AQOs, and these have been taken into account in the assessments for the ES and ESA. However, these air quality-related health effects are not significant and the WHO guidance has not changed that and, in any event, these effects need to be balanced against other beneficial health effects such as from socio-economic impacts. On balance the Appeal Proposal is likely to contribute to improving the health and well-being of the local population more than it detracts from it.