

Statutory Consultation 2022

Preliminary Environmental Information Report

Volume 2: Main Report
Chapter 7: Air Quality

Contents

	Page
7 Air quality	1
7.1 Introduction	1
7.2 Legislation, policy and guidance	3
7.3 Scope of the assessment	17
7.4 Stakeholder engagement and consultation	24
7.5 Methodology	27
7.6 Assumptions and limitations	31
7.7 Baseline conditions	34
7.8 Embedded and good practice mitigation measures	38
7.9 Preliminary assessment	40
7.10 Additional mitigation	48
7.11 Residual effects	49
7.12 In-combination climate change effects	50
7.13 Monitoring	53
7.14 Preliminary assessment summary	54
7.15 Completing the assessment	58
Competent Experts	59
Glossary and Abbreviations	60
References	63

Tables

Table 7.1: Air quality legislation
Table 7.2: Air quality standards
Table 7.3: Air quality policy
Table 7.4: How relevant air quality requirements of ANPS are addressed in this PEIR
Table 7.5: Air quality guidance
Table 7.6: Air quality Scoping Opinion comments
Table 7.7: Stakeholder engagement relating to air quality
Table 7.8: AQMA details and NO ₂ monitoring results
Table 7.9: Summary of construction dust effects
Table 7.10: Qualitative Sensitivity Analysis
Table 7.11: Air quality in-combination climate change impacts
Table 7.12: Air quality preliminary assessment summary

7 AIR QUALITY

7.1 Introduction

7.1.1 This chapter presents the preliminary assessment of likely significant effects of the Proposed Development on air quality.

7.1.2 The EIA Scoping Report, provided in **Appendices 1.1 and 1.2** in Volume 3 to this Preliminary Environmental Information Report (PEIR), set out the proposed scope for the assessment of air quality. In summary, the following have been assessed in this PEIR:

- a. dust and particulate matter (PM₁₀, PM_{2.5}) emissions arising from demolition, earthwork and construction works;
- b. increased emissions from vehicle journeys as a result of construction activity;
- c. increased emissions as a result of staff and passenger vehicle journeys to and from the airport on the road network;
- d. increased emission from aircraft engines;
- e. increased exhaust emissions from vehicles and mobile equipment operating at the airport;
- f. increased emissions from energy and heating combustion plant operating at the airport;
- g. miscellaneous emission from other airport activities, such as fire training and engine testing; and
- h. qualitative odour assessment of operational scenarios.

7.1.3 The remainder of this chapter consists of:

- a. **Section 7.2** Legislation, policy and guidance relevant to the scope and methodology of the air quality preliminary assessment;
- b. **Section 7.3** Scope of the assessment;
- c. **Section 7.4** Stakeholder engagement undertaken to inform the preliminary assessment;
- d. **Section 7.5** Methodology applied to the preliminary assessment;
- e. **Section 7.6** Assumptions and limitations at this stage of work;
- f. **Section 7.7** Baseline conditions;
- g. **Section 7.8** Embedded and good practice mitigation;
- h. **Section 7.9** Preliminary assessment;
- i. **Section 7.10** Additional mitigation;
- j. **Section 7.11** Residual effects;
- k. **Section 7.12** In-combination climate change;
- l. **Section 7.13** Monitoring;

- m. **Section 7.14** Assessment summary; and
- n. **Section 7.15** Completing the assessment - remaining work to complete the EIA for the Environmental Statement (ES) to be submitted with the application for development consent.

7.2 Legislation, policy and guidance

7.2.1 This section identifies the key legislation, policy and guidance relevant to the scope and methodology for the air quality assessment which may influence the type of mitigation measures that could be incorporated into the Proposed Development during construction and/or operation.

7.2.2 **Table 7.1** to **Table 7.5** provides a description of the relevant legislation, policy and guidance, and where each of these have been addressed in this PEIR.

Legislation

Table 7.1: Air quality legislation

Legislation	How and where addressed in PEIR
<p>Air Quality Standards Regulations 2010 (amended in 2016) (Ref. 7.1)</p> <p>Prior to UK's withdrawal from the EU, the following three EU directives were transposed into national legislation in England by the Air Quality Standards Regulations:</p> <ol style="list-style-type: none"> a. Air Quality Framework Directive on ambient air quality assessment and management (96/62/EC) (Ref. 7.2) which defines the policy framework for 12 air pollutants b. Daughter Directives, including Directive 1999/30/EC (the 1st Daughter Directive) (Ref. 7.3) c. Directive 2008/50/EC on ambient air quality and cleaner air for Europe (Ref. 7.4) <p>The directive set the standards for pollutants known to have harmful effects to human health and the environment and set limit values and timescales for their achievement. In particular, limit values for each specified pollutant were set through a series in the above Directives: Directive 1999/30/EC relates to nitrogen dioxide (NO₂), oxides of nitrogen (NO_x) and particulate matter (amongst other pollutants), Directive 2000/69/EC relates to benzene and carbon monoxide, Directive 2002/3/EC for ozone, Directive 2004/107/EC relates to toxic heavy metals</p>	<p>This legislation for England remains in force and sets the requirements that the Secretary of State (SoS) for the Environment has for air quality, which is ensuring compliance with the air quality limit values. These limit values, referred to as 'standards' hereafter, have been provided in Table 7.2 and used in the assessment as provided in Section 7.9.</p>

Legislation	How and where addressed in PEIR
<p>and polycyclic aromatic hydrocarbons, and Directive 2008/50/EC relates to NO₂, NO_x, particulate matter, sulphur dioxide, lead, benzene and carbon monoxide.</p>	
<p>Environment Act 1995 (Ref. 7.5)</p> <p>Part IV of the Environment Act 1995 places a duty on the SoS for the Environment to develop, implement and maintain an air quality strategy with the aim of reducing atmospheric emissions and improving air quality. The Clean Air Strategy (presented in Table 7.3) provides this framework. This includes the statutory duty for local authorities to undergo a process of local air quality management and declare Air Quality Management Areas (AQMAs) where necessary.</p>	<p>The impact at the AQMAs is discussed in Section 7.7 have been assessed and results presented in Section 7.9.</p>
<p>Environment Act 2021 (Ref. 7.6)</p> <p>The Environment Act 2021 requires the Secretary of State to set long-term target (15-year minimum) for air quality, and a target (no mandate on length) for the annual amount of PM_{2.5} in the air. These targets have not yet been set but will be kept under review.</p> <p>It also requires Local Authorities to produce an action plan to ensure standards are met for air quality management areas.</p> <p>The Act requires the National Air Quality Strategy to be reviewed at least every 5 years.</p>	<p>The impact at the AQMAs is discussed in Section 7.7 have been assessed and results presented in Section 7.9. This assessment considers current legislated limits in the Air Quality Standard Regulations. However, the aspirations of the Act are considered in the mitigation provided in Section 7.8, which looks to reduce impacts, even at locations where the limits are not predicted to be exceeded.</p> <p>The Applicant will keep any action plans or updates under review ahead of the application for development consent.</p>
<p>National Emissions Ceilings Regulations 2018 (Ref. 7.7)</p> <p>In December 2016, Directive 2016/2284/EU on the reduction of national emissions of certain atmospheric pollutants came into force (the National Emissions Ceiling Directive). This Directive replaced previous versions, set emission ceilings for various pollutants and set emission reduction</p>	<p>The emissions of NO_x and PM_{2.5} related to the airport have been calculated using the methodology in Appendix 7.1 in Volume 3 of this PEIR. A summary of impacts from the emissions calculated has been provided in Section 7.9.</p>

Legislation	How and where addressed in PEIR
commitments for European member states (including for NO _x and PM _{2.5}). The Directive has been transposed into national legislation in England by the National Emission Ceiling Regulations 2018.	

Air Quality Standards

7.2.3 **Table 7.2** below sets out the air quality standards for the pollutants of most relevance to this assessment. Other pollutants have been screened out of this air quality assessment as they are not likely to cause exceedances of their respective standards as demonstrated by local monitoring and the work carried out by the local authority.

Table 7.2: Air quality standards from the 2010 Regulations (Ref. 7.1)

Pollutant	Averaging period	Air quality standard
Nitrogen dioxide (NO ₂)	Annual mean	40µg/m ³
	1-hour mean	200µg/m ³ not to be exceeded more than 18 times a year
Particulate matter (PM ₁₀)	Annual mean	40µg/m ³
	24-hour mean	50µg/m ³ not to be exceeded more than 35 times a year
Fine particulate matter (PM _{2.5})	Annual mean	25µg/m ³
Oxide of nitrogen (NO _x)*	Annual mean	30µg/m ³

Notes: *For protection of vegetation and ecosystems rather than human health.

Policy

Table 7.3: Air quality policy

Policy	How and where addressed in PEIR
<p>National Planning Policy Framework (2021) (Ref. 7.8)</p> <p>The National Planning Policy Framework (NPPF) refers to how the planning system should contribute to and enhance the natural and local environment and prevent new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of air pollution</p>	<p>Section 7.8 provides the mitigation that looks to reduce the impacts to the natural and local environment. The standards have been used in the assessment as provided in Section 7.9, which include values relevant to the natural environment. The Getting to and from the airport – our emerging transport strategy (published at statutory consultation) refers to the sustainable transport options as part of the Proposed Development.</p>

Policy	How and where addressed in PEIR
<p>(Paragraph 174); how planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national standards for pollutants (Paragraph 186); and how sustainable transport should be focused on to help reduce congestion and emissions and improve air quality (Paragraph 105).</p>	
<p>National Policy Statement for National Networks – December 2014 (NPSNN) (Ref. 7.9)</p> <p>The NPSNN sets out the need for, and Government’s policies to deliver, development of nationally significant infrastructure projects on the national road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects (NSIP) on the road and rail networks. The provisions of the NPSNN relevant to environmental assessment broadly mirror those as outlined in the ANPS.</p>	<p>There are no elements of the Proposed Development that would be classified as a NSIP on the national road or rail network. However, the NPSNN remains a relevant consideration as works are proposed on the SRN at Junction 10 as part of the Proposed Development. As provisions relevant to environmental assessment broadly mirror those as outlined in the ANPS they have been appropriately considered in this preliminary assessment. Further consideration of the proposals against relevant NPSNN policies will take place following this consultation and in preparation of the DCO application.</p>
<p>The Clean Air Strategy 2019 (Ref. 7.10)</p> <p>This provides the framework for ensuring compliance with air quality standards based on a combination of international, national and local measures to reduce emissions and improve air quality.</p>	<p>The standards have been used in the assessment as provided in Section 7.9.</p>
<p>Aviation Policy Framework (Ref. 7.11)</p> <p>The aviation policy framework sets out the government’s policy to allow the aviation sector to continue to make a significant contribution to economic growth across the country. It provides the baseline for the Airports Commission to take into account environmental impacts. It sets out government’s objectives on the issues which will challenge and support the development of aviation across the UK.</p> <p>The policy on air quality is to seek improved international standards to reduce emissions from aircraft and vehicles and to work with airports and local authorities as</p>	<p>An assessment of potential air quality impacts from the construction and operational phase has been undertaken as provided in the methodology in Section 7.5, including emissions of NO_x, PM₁₀ and PM_{2.5} from the airport and airport related traffic. The air quality impacts at receptors including those within AQMAs are presented in Section 7.9. Section 7.8 provides the measures to mitigate air quality impacts.</p>

Policy	How and where addressed in PEIR
<p>appropriate to improve air quality, including encouraging HGV, bus and taxi operators to replace or retrofit with pollution-reducing technology older, more polluting vehicles.</p> <p>The policy states that around airports, sources of air pollution include aircraft engines, airport related traffic on local roads and surface vehicles at the airport. The most important pollutants are NO_x and particulate matter (PM₁₀ and PM_{2.5}).</p> <p>Air quality in local air quality management areas or where limit values are exceeded are particularly sensitive to new developments or transport pressures, and cumulative impacts from different individual sites can exacerbate this.</p> <p>Airports are large generators of surface transport journeys and as such share a responsibility to minimise the air quality impact of these operations.</p>	
<p>Aviation strategy: making best use of existing runways (Ref. 7.12)</p> <p>As a result of the Aviation strategy call for evidence and further analysis, government has set out its support of airports beyond Heathrow making best use of their existing runways, subject to related economic and environmental considerations being considered.</p> <p>This document forms part of the government’s wider Aviation strategy and sets out the detail of the ‘making best use’ policy.</p> <p>The main issues raised included the need for environmental issues such as noise, air quality, and carbon to be fully addressed as part of any airport proposal.</p> <p>Most of the concerns raised can be addressed through the existing policies as set out in the 2013 Aviation Policy Framework, or through more recent policy updates such as the new UK Airspace Policy or National Air Quality Plan.</p> <p>For the majority of environmental concerns, the government expects these to be taken</p>	<p>Air quality impacts assessed are provided in Section 7.9. Section 7.8 provides the mitigation that looks to reduce the impacts to the natural and local environment.</p>

Policy	How and where addressed in PEIR
<p>into account as part of existing local planning application processes.</p> <p>The government recognises the impact on communities living near airports and understands their concerns over local environmental issues, particularly noise, air quality and surface access.</p> <p>As airports look to make the best use of their existing runways, it is important that adverse impacts are mitigated where possible.</p>	
<p>Aviation Strategy (consultation finished) (Ref. 7.13)</p> <p>The Government has prepared a draft of the Aviation Strategy which will replace the Aviation Policy Framework when finalised. As part of the emerging Aviation Strategy, the Government published a policy paper entitled 'Aviation 2050: The future of UK aviation'.</p> <p>The government aims to "achieve a safe, secure and sustainable aviation sector...provided that growth takes place in a sustainable way, with actions to mitigate the environmental impacts". It will investigate whether the regulations, controls and incentives in place will tackle air quality concerns and ensure that there is "a robust policy framework and package of measures to reduce the harmful effects of aviation on the environment, such as carbon emissions, air quality and noise".</p>	<p>Air quality impacts assessed are provided in Section 7.9. Section 7.8 provides the measures to mitigate air quality impacts.</p>
<p>Jet Zero Consultation (Ref. 7.14)</p> <p>The focus of this consultation, and the forthcoming strategy, is reducing CO₂ emissions; however delivery on this can provide other environmental benefits, such as improving air quality.</p>	<p>The consultation document sets out the proposed approach and principles to deliver the ambition of decarbonising aviation. The proposals have been considered in the Air Quality Plan Appendix 7.4 in Volume 3 of this PEIR and have also framed the ambition in the GCG proposals.</p>
<p>Decarbonising Transport (Ref. 7.15)</p> <p>This plan sets out the government's commitments and the actions needed to</p>	<p>The vehicle fleet emissions used in this assessment are provided in the methodology in Section 7.5 and Appendix 7.1 in Volume 3 of this PEIR.</p>

Policy	How and where addressed in PEIR
<p>decarbonise the entire transport system in the UK.</p> <p>It includes the pathway to net zero transport in the UK; the wider benefits net zero transport can deliver (including air quality benefits); and the principles that underpin the approach to delivering net zero transport including commitments to end the sale of new petrol and diesel cars and vans by 2030, from 2035 all new cars and vans must be zero emission at the tailpipe.</p>	
<p>The Luton Local Plan 2011-2031 (Ref. 7.16)</p> <p>Policy LLP6 relates to London Luton Airport. Regarding proposals for airport expansion, the policy states the following: <i>“Proposals for development will only be supported where the following criteria are met, where applicable/appropriate having regard to the nature and scale of such proposals:-</i></p> <p><i>[...]</i></p> <p><i>iv. they fully assess the impacts of any increase in Air Transport Movements on surrounding occupiers and/or local environment (in terms of noise, disturbance, air quality and climate change impacts), and identify appropriate forms of mitigation in the event significant adverse effects are identified;”</i></p> <p>Policy LLP38 regarding pollution and contamination. The policy states: <i>“Evidence on the impacts of development will need to demonstrate whether the scheme (individually or cumulatively with other proposals) will result in any significantly adverse effects with regard to air, land or water on neighbouring development, adjoining land or the wider environment. Where adverse impacts are identified, appropriate mitigation will be required. This policy covers chemical, biological and radiological contamination and the effects of noise, vibration, light,</i></p>	<p>The increase in Air Transport Movements (ATMs) have been assessed as discussed in Section 7.5 and Section 7.8 provides the measures to mitigate air quality impacts.</p> <p>Cumulative impacts have been assessed and discussed in Chapter 21 in Volume 2 of this PEIR, and Section 7.8 provides the measures to mitigate air quality, odour and dust impacts.</p>

Policy	How and where addressed in PEIR
<p><i>heat, fluid leakage, dust, fumes, smoke, gaseous emissions, odour, explosion, litter and pests.”</i></p>	
<p>Central Bedfordshire Council (CBC) Local Plan 2015-2035 (Ref. 7.17)</p> <p>The CBC Local Plan 2015-2035 Strategic Objective SO13 states: <i>“Support the necessary changes to adapt to climate change by minimising emissions of carbon and local air quality pollutants”</i></p> <p>Policy HQ1 states: <i>“The Council will ensure that all developments are of the highest possible quality and respond positively to their context. All development proposals, including extensions and change of use, must ensure that: [...] There is not an unacceptable adverse impact upon nearby existing or permitted uses, including impacts on amenity, privacy, noise or air quality.”</i></p> <p>Policy CC8 also refers to airborne pollution and states: <i>“Development proposals which are likely to cause pollution or land instability, or are likely to be exposed to potential unacceptable levels of pollution or land instability will only be permitted where it can be demonstrated that:</i></p> <ol style="list-style-type: none"> <i>1. In or near an AQMA, development would not have a negative impact on the local air quality and that;</i> <i>2. Measures can be implemented to minimise the impacts of pollution and land instability to an acceptable level without compromising the quality of life for users and occupiers, which protects health, natural and historic environment, water quality, property, infrastructure and amenity; and</i> 	<p>The air quality impacts within the CBC South Bedfordshire AQMA and the results are presented in Section 7.9. Section 7.8 provides the measures to mitigate air quality impacts.</p>

Policy	How and where addressed in PEIR
<p><i>3. The conditions of the site can be suitably mitigated or land can be remediated for the proposed end use and cause no adverse effects.”</i></p>	
<p>North Hertfordshire District Council (NHDC) Draft Local Plan for 2011-2031 (Ref. 7.18)</p> <p>NHDC produced a Proposed Submission Draft Local Plan for 2011-2031 in 2016. Policy D4 addresses air quality and states: <i>“Planning permission will be granted where development proposals:</i></p> <p><i>a. Give consideration to the potential or actual impact on local air quality, both during the demolition/ construction phase and as a result of its final occupation and use;</i></p> <p><i>b. Propose appropriate levels of mitigation to minimise emissions to the atmosphere and their potential effects upon health and the local environment; and</i></p> <p><i>c. Carry out air pollution impact assessments, where required, to determine the impact on local air quality of the development, otherwise the development may be refused.</i></p> <p><i>Where air pollution impact assessments are not required there will still be a requirement on developers to provide appropriate levels of mitigation to address emissions of pollutants to the atmosphere.”</i></p>	<p>An assessment of potential air quality impacts from the construction phase and operational has been undertaken as provided in the methodology in Section 7.5. Section 7.8 provides the measures to mitigate air quality impacts.</p> <p>NHDC has also produced an Air Quality Planning Guidance Document in support of their Local Plan. The document provides guidance for impact assessment and mitigation. This guidance has been considered in the methodology provided Section 7.5.</p>

- 7.2.4 The Airports National Policy Statement (ANPS) (Ref. 7.19) does not have effect in relation to an application for development consent for an airport development not comprised of an application relating to the Heathrow Northwest Runway. Nevertheless, as set out within paragraph 1.41 of the ANPS, the Secretary of State considers that the contents of the ANPS will be both important and relevant considerations in the determination of such an application, particularly where it relates to London or the south east of England.
- 7.2.5 Accordingly, whilst the ANPS does not have effect in relation to the Proposed Development, it will be an important and relevant consideration in the determination of the application for development consent. A summary of the relevant provisions for the air quality assessment and how and where these have been addressed in this PEIR is provided within **Table 7.4**.

Table 7.4: How relevant air quality requirements of ANPS are addressed in this PEIR

ANPS Section	How and where addressed in PEIR
<p>Paragraph 5.5</p> <p><i>“The Government’s objective for surface access is to ensure that access to the airport by road, rail and public transport is high quality, efficient and reliable for passengers, freight operators and airport workers who use transport on a daily basis. The Government also wishes to see the number of journeys made to airports by sustainable modes of transport maximised as much as possible. This should be delivered in a way that minimises congestion and environmental impacts, for example on air quality.”</i></p>	<p>Chapter 18 of this PEIR considers access to the airport. The air quality impacts from road traffic has been assessed and the results are presented in Section 7.9</p>
<p>Paragraph 5.33</p> <p><i>“The environmental statement should assess:</i></p> <ul style="list-style-type: none"> <i>• Existing air quality levels for all relevant pollutants referred to in the Air Quality Standards Regulations 2010 and the National Emission Ceilings Regulations 2002 (as amended) or referred to in any successor regulations;</i> <i>• Forecasts of levels for all relevant air quality pollutants at the time of opening, (a) assuming that the scheme is not built (the ‘future baseline’), and (b) taking account of the impact of the scheme, including when at full capacity; and</i> <i>• Any likely significant air quality effects of the scheme, their mitigation and any residual likely significant effects, distinguishing between those applicable to the construction and operation of the scheme including any interaction between construction and operational changes and taking account of the impact that the scheme is likely to cause on air quality arising from road and other surface access traffic.”</i> 	<p>This PEIR has included an assessment of existing air quality levels for all pollutants at risk of exceeding the air quality limit values in the study area. For detail of the air quality baseline, please see baseline information provided in Section 7.7.</p> <p>The assessment forecasts levels for all relevant air quality pollutants at the time of opening, with and without the Proposed Development in operation. See Section 7.7. A summary of impacts has been provided in Section 7.9.</p> <p>The assessment determines the significance of effects from all Proposed Development related activities (both construction and operation). See Appendix 7.1 Volume 3 of this PEIR. A summary of impacts has been provided in Section 7.9.</p>
<p>Paragraph 5.42 and 5.43 set out the considerations for decision-making with regard to air quality.</p>	<p>The assessment includes consideration of all areas which are likely to be particularly relevant to the decision-making by the</p>

ANPS Section	How and where addressed in PEIR
<p><i>“5.42 The Secretary of State will consider air quality impacts over the wider area likely to be affected, as well as in the vicinity of the scheme. In order to grant development consent, the Secretary of State will need to be satisfied that, with mitigation, the scheme would be compliant with legal obligations that provide for the protection of human health and the environment.</i></p> <p><i>5.43 Air quality considerations are likely to be particularly relevant where the proposed scheme:</i></p> <ul style="list-style-type: none"> <i>• is within or adjacent to Air Quality Management Areas, roads identified as being above limit values, or nature conservation sites (including Natura 2000 sites and Sites of Special Scientific Interest);</i> <i>• would have effects sufficient to bring about the need for new Air Quality Management Areas or change the size of an existing Air Quality Management Area, or bring about changes to exceedances of the limit values, or have the potential to have an impact on nature conservation sites; and</i> <i>• after taking into account mitigation, would lead to a significant air quality impact in relation to Environmental Impact Assessment and / or to a deterioration in air quality in a zone or agglomeration.”</i> 	<p>Secretary of State. A summary of impacts has been provided in Section 7.9.</p>

Guidance

Table 7.5: Air quality guidance

Guidance	How and where addressed in PEIR
<p>Local Air Quality Management Technical Guidance (Ref. 7.20)</p> <p>The Local Air Quality Management (LAQM) Technical Guidance, TG(16) is designed to support local authorities in carrying out their duties to review and assess air quality in their area. It provides the technical guidance for carrying out air quality assessments using existing air quality tools.</p>	<p>Where relevant, this guidance has been taken in to account in the assessment methodology in Section 7.5.</p>

Guidance	How and where addressed in PEIR
<p>Institute of Air Quality Management Dust Guidance (Ref. 7.21)</p> <p>The Institute of Air Quality Management (IAQM) dust guidance provides a methodology for development consultants and environmental health officers on how to assess air quality impacts from demolition and construction.</p>	
<p>EPUK/IAQM Land Use Planning and Development Control (Ref. 7.22)</p> <p>The Land-Use Planning and Development Control guidance document produced by Environmental Protection UK (EPUK) and the IAQM provides a framework for professionals operating in the planning system to provide a means of reaching sound decisions, having regard to the air quality implications of development proposals.</p> <p>The document provides guidance on when air quality assessments are required by providing screening criteria regarding the size of a development, changes to traffic flows/composition energy facilities or combustion processes associated with the development.</p>	
<p>IAQM Odour and Planning Guidance (Ref. 7.23)</p> <p>The IAQM has published guidance for assessing odour impacts (on amenity) for planning purposes. This includes information on various assessment methods to be used to undertaken odour assessments for planning.</p>	

Guidance	How and where addressed in PEIR
<p>ICAO Airport Air Quality Manual (Ref. 7.24)</p> <p>The International Civil Aviation Organization (ICAO) has published a manual for assessing air quality at airports. This document describes the methods for calculating emissions during different operating modes of the aircraft, as well as different sources of air pollution found at airports.</p>	
<p>Air Navigation Guidance 2017 (Ref. 7.25)</p> <p>In January 2002, the then Department for Transport, Local Government and the Regions issued guidance to the CAA which has subsequently formed the basis of how the CAA interprets its environmental duties in respect of carrying out its air navigation functions including approving changes to the UK's airspace design.</p> <p>With regards to air quality, the guidance states:</p> <p><i>“Studies have shown that NOx emissions from aviation related operations reduce rapidly beyond the immediate area around the runway. Due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet are unlikely to have a significant impact on local air quality. Therefore the impact of airspace design on local air quality is generally negligible compared to changes in the volume of air traffic and that of the local transport infrastructures feeding the airport.”</i></p>	

Guidance	How and where addressed in PEIR
<p>World Health Organization (WHO) global air quality guidelines (Ref. 7.26)</p> <p>The 2021 guidelines update the previous 2006 edition with generally more stringent guidelines for pollutants. These guidelines, take into account the latest body of evidence on the health impacts of different air pollutants.</p> <p>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. These guidelines are not legally binding standards.</p>	<p>The World Health Organisation (WHO) Global Air Quality guidelines are not currently part of UK legislation, so the thresholds used to assess against for schemes remain the same. Until these thresholds are changed which may or may not reflect the WHO Guidelines then assessment is undertaken in accordance with current legislation which is consistent with compliance with policy standards. In order to determine the significance of air quality impacts the methodology detailed in Section 7.5 has been used. However, the mitigation provided in Section 7.8, looks to reduce impacts, even at locations where the current legislated standards are not predicted to be exceeded. The Draft Green Controlled Growth Proposals also provides an enforceable and ambitious mechanism for controlling air quality.</p>

7.3 Scope of the assessment

7.3.1 This section describes the scope of the air quality assessment, including how the assessment has responded to the Scoping Opinion. The temporal and spatial scope, the relevant receptors, and matters scoped in and out are identified. A description of engagement undertaken with relevant technical stakeholders to develop and agree this scope is provided in **Section 7.4**.

Scoping Opinion

7.3.2 The EIA Scoping Report set out the proposed scope and assessment methodologies to be employed in the EIA and is provided in **Appendices 1.1 and 1.2** of Volume 3 to this PEIR.

7.3.3 In response to that Scoping Report, a Scoping Opinion was received from the Planning Inspectorate on 9 May 2019 and is provided in **Appendix 1.3** in Volume 3 of this PEIR.

7.3.4 **Table 7.6** describes the main matters highlighted by the Planning Inspectorate in the Scoping Opinion and how these have been addressed in this PEIR. Final responses to all comments received during Scoping will be provided in an appropriate format in the ES.

Table 7.6: Air quality Scoping Opinion comments

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
4.1.1	The Inspectorate considers that significant effects from increased flight movements are not anticipated in relation to this matter [i.e., jettisoning of fuel from aircraft] and that it may be scoped out from further assessment. This is on the basis that jettisoning of fuel is an infrequent event that will occur over water and at high altitude in order to vaporise the fuel and facilitate dispersion.	Scoped out. No action required.
4.1.2	The Scoping Report sets out the approach to the air quality assessment, and details throughout the aspect chapter the main issues and impacts likely to occur. However, these issues/impacts are not described consistently within the chapter. The ES should clearly assess any air quality impacts where significant effects are likely to arise during both construction	This PEIR clearly assesses any air quality impacts where significant effects are likely to arise during both construction and operation of the proposed development in Section 7.9 and this will also be included in the ES.

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	and operation of the Proposed Development.	
4.1.3	The Scoping Report states that consultation with the relevant local authorities will continue throughout the pre-application stages of the Proposed Development. Any agreements reached with the consultation bodies on the Applicant's methodological approach should be documented in the ES, where possible.	Table 7.7 includes details of consultation and agreements with consultation bodies undertaken up to this PEIR. The ES will include an update of this information.
4.1.4	The Applicant proposes a study area of 15km by 15km centred on the main site of the Proposed Development, and any additional roads outside of this area. The Inspectorate considers that the model extent should not be arbitrarily defined but instead should relate to the area over which significant air quality effects arising from the Proposed Development may occur, including a consideration of any Off-site Highways Interventions. This should be clearly defined within the ES. The Applicant should make effort to agree the study area with relevant consultation bodies. The assessment in the ES should have regard to the Air Navigation Guidance 2017 with respect to the parameters for assessment of aviation emissions on local air quality.	The study area has been clearly defined and justified in this PEIR to account for airport emission sources, aircraft emissions during arrival and departure up to an altitude of 457m, and the affected road network (ARN) as detailed in Section 7.5 . The modelling scenarios are also provided. The study area has been discussed and developed with stakeholders in the air quality working group from 2018 to 2021 as detailed in Section 7.4 .
4.1.5	The Scoping Report refers to local nature sites that lie within 2km of the site of the Proposed Development and refers to the biodiversity aspect chapter as providing further detail on these. The ES should provide a full assessment of the air quality impacts on these sites where significant effects are likely. Where information to support the assessment is to be presented in the biodiversity aspect chapter of the ES, clear cross referencing to the relevant sections of other chapters should be included and, where relevant,	Assessment of impacts at ecological sites has been carried out in this PEIR, Section 7.9 .

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
	supporting plans provided in order to assist the reader.	
4.1.6	The Scoping Report states that baseline data collection is ongoing, with both desk studies and field surveys undertaken to date. The ES should clearly set out all studies and surveys undertaken to inform the final baseline information, including the timing of any site visit and how/if professional judgement has been applied. The Applicant should make effort to agree its approach with the relevant consultation bodies.	The location and data collection for on-going surveys has been discussed and agreed with the relevant local authorities. Details of baseline information collected to date are included in this PEIR, Section 7.7 . This information will be updated for the ES.
4.1.7	The Scoping Report states that the future assessment years are based on current forecast passenger demands and proposed capacity phasing. The Inspectorate understands that these demands could change, and that this would also have a bearing on the assessment scenarios to be used in the Traffic and Transport aspect chapter. The ES should also assess effects occurring during key phases of the construction and operation of the Proposed Development, outlined at Paragraph 3.6.2 of the Scoping Report as 2027 and 2036. The ES should clearly set out the years on which the assessments have been undertaken, providing a full justification for the years chosen.	This PEIR has assessed future assessment years of 2027 (21.5 mppa), 2039 (27 mppa) and 2043 (32 mppa) using current demand forecasts. These are clearly reported in Section 7.9 . The reasons for these years being selected are described in Chapter 5 of this PEIR.
4.1.8	The Scoping Report states that the potential odours from construction will be considered as part of the soils and geology assessment rather than within the air quality aspect chapter. The ES should contain adequate cross referencing to direct the reader to the relevant sections of the ES to ensure that a robust assessment of air quality impacts has been undertaken.	The potential for odour from construction activity has been considered in the methodology provided in Appendix 7.1 in Volume 3 of this PEIR. The results of the odour assessment are provided in Section 7.9 .

Scoping Opinion ID	Scoping Opinion comment	How is this addressed
4.1.9	The Scoping Report states that ‘the air quality assessment will determine the population affected by significant concentrations’ and that this will then be considered in the health and community aspect chapter. The ES should contain adequate cross referencing to direct the reader to the relevant sections of the ES to ensure that a robust assessment of air quality impacts to the health of receptors has been undertaken.	This assessment has determined the population affected by significant concentrations and the results of significance are provided in Section 7.9 . Cross referencing is provided where appropriate.
4.1.10	The Applicant should also give consideration to operational mitigation measures such as single engine taxi, measures to incentivise reductions in use of aircraft auxiliary power units whilst on stand (using fixed electrical ground power and preconditioned air) in its assessment.	Operational mitigation measures have been embedded in the design and a Draft Air Quality Plan (Appendix 7.4 in Volume 3 of this PEIR) has been included detailing all proposed mitigation measures.
4.1.11	The ES should include an assessment of the impacts associated with activities involving combustion, where they are likely to give rise to significant effects.	This PEIR includes assessment of on-site combustion activities where they are likely to give rise to significant effects. See Section 7.5 .
4.1.12	The Inspectorate considers that the potential for air quality effects on rivers and flood storage areas due to deposition of pollutants should be taken into account within the assessment, particularly where the Proposed Development has potential to give rise to stagnant or low flow conditions, where likely significant effects could occur.	With regards to nitrogen deposition as a result of NO _x emissions, an assessment of impacts at relevant ecological sites has been carried out in this PEIR, Section 7.9 . The Proposed Development does not give rise to any stagnant or low flow conditions in any water body. No surface water flood storage areas are proposed, and those existing are for attenuation not permanent storage. The Proposed Development does not increase flood risk. Therefore, no significant effects are likely and these receptors are not considered further in this assessment.

Spatial scope

Study area

- 7.3.5 The criteria from the IAQM dust guidance (Ref. 7.21) has been used to determine the study area for the assessment of construction dust, which states the following:
- 350m from the boundary of dust generating activity (50m for ecological effects); and
 - 50m from the routes used by construction vehicles, up to 500m from the construction site entrance.
- 7.3.6 For the assessment of operational emissions, the criteria from the IAQM/EPUK guidance (Ref. 7.22) has been used to determine the affected road network (ARN). The ARN includes all roads in the traffic model which are predicted to experience, due to the Proposed Development:
- a change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) movements within or adjacent to an AQMA, or more than 500 AADT elsewhere;
 - a change of Heavy-Duty Vehicle (HDV) flows of more than 25 AADT movements within or adjacent to an AQMA, or more than 100 AADT elsewhere;
 - a change of 5m or more in the realignment of a road and the road is within an AQMA; or
 - The introduction or removal of a junction near relevant receptors which cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
- 7.3.7 A 15km by 15km grid area around the centre of the Main Application Site (as defined in **Chapter 2**) of the Proposed Development has been modelled. The 15km by 15km area is selected to account for possible significant effects to air quality as a result of airport emission sources and was selected to cover the immediate vicinity of the airport, Luton and the AQMAs in Hitchin. It was also selected to account for aircraft emissions during arrival and departure up to an altitude of 457m, further details are provided in **Appendix 7.1** in Volume 3 of this PEIR. Previous modelling assessments at other major UK airports have shown that air quality impacts from aircraft and on-airport sources are captured by a study area of this scale.
- 7.3.8 Not all roads included in the traffic model in the 15km by 15km study area are expected to experience changes of the magnitude detailed above. However, for the modelling to be more complete, some roads within the 15km by 15km study area that do not satisfy the IAQM/EPUK criteria have been included, using professional judgement and to include road emission within 200m of receptors in proximity to the ARN. For example, roads located in the key AQMAs being considered have been assessed regardless of the predicted changes
- 7.3.9 The study area is shown in **Figure 7.1** in Volume 4 of this PEIR.

Zone of influence

- 7.3.10 The zone of influence (ZOI) for air quality is the 15km by 15km study area around the Proposed Development, as well as the defined ARN and . The full cumulative effects assessment is provided in **Chapter 21** In-Combination and Cumulative Effects Assessment.

Temporal Scope

- 7.3.11 The Proposed Development has been assessed over three assessment phases, during which construction and operation may take place simultaneously. Assessment years for each phase are described in **Chapter 5** of this PEIR.
- 7.3.12 The air quality assessment considers the following scenarios:
- a. Baseline (2019);
 - b. 2027 with and without the Proposed Development (including construction traffic);
 - c. 2039 with and without the Proposed Development (including construction traffic); and
 - d. 2043 with and without the Proposed Development (including construction traffic).
- 7.3.13 The scenarios capture the assessment phases (Phase 1, Phase 2a and Phase 2b) described in **Table 5.3** and assess the combination of the operational and construction impacts occurring in the same phase.

Receptors

- 7.3.14 For the assessment of construction dust the identification of receptors and their sensitivity to dust effects followed IAQM guidance (Ref. 7.21).
- 7.3.15 For the assessment of all other impacts all sensitive receptors are considered to be equally sensitive. Sensitive human receptors are defined as residential properties, schools, hospitals and care homes which are located in areas which may experience a change in pollutant concentrations.
- 7.3.16 Sensitive ecological receptors assessed include statutory designated sites including the following:
- a. Special Areas of Conservation (SAC);
 - b. Special Protection Areas (SPA);
 - c. Site of Special Scientific Interest (SSSI);
 - d. National Nature Reserves (NNRs);
- 7.3.17 Non-statutory designated ecological sites have also been assessed, which include the following:
- a. Local Nature Reserves (LNRs);
 - b. Local Wildlife Sites (LWS);

- c. Ancient Woodland (AW); and
- d. Veteran Trees.

7.3.18 Cultural heritage receptors have been added following consultation to assess sensitive locations which could be affected by acid erosion from air pollutants.

7.3.19 Details of the receptors are provided in **Appendix 7.1** in Volume 3 of this PEIR.

Matters scoped in

Construction

7.3.20 The following have been assessed in relation to demolition, earthwork and construction activity:

- a. the generation of dust, odour and elevated levels of particulate matter (PM₁₀, PM_{2.5}) arising from demolition and construction works;
- b. increased journeys (construction related) to and from the Proposed Development on the road network; and
- c. increased exhaust emissions from vehicles operating at the airport, airside and landside.

Operation

7.3.21 The following have been assessed in relation to the future operation of the Proposed Development:

- a. increased staff and passenger journeys to and from the airport on the road network;
- b. increased emissions from aircraft engines;
- c. increased exhaust emissions from vehicles operating at the airport, airside and landside;
- d. increased emissions from energy and heating combustion plant;
- e. miscellaneous emissions from other airport activities, such as aircraft fire training and engine testing; and
- f. odour emissions from airside sources.

Matters scoped out

7.3.22 The impacts from jettisoning of fuel from aircraft will not be considered, following agreement in the scoping opinion from the Planning Inspectorate, and recorded in **Table 7.6**. The jettisoning of fuel from aircraft is only undertaken in emergency scenarios, when an aircraft is required to undertake an emergency landing. Jettisoning of fuel will usually occur over water and at high altitude in order to vaporise the fuel and facilitate dispersion. Due to the infrequency of these events, it is considered that there is no potential significant effect from these activities.

7.3.23 The potential for air quality effects on rivers and flood storage areas due to deposition of pollutants has been scoped out (see **Table 7.6** above). The

Proposed Development does not give rise to any stagnant or low flow conditions in any water body. No surface water flood storage areas are proposed, and those existing are for attenuation not permanent storage. The Proposed Development does not increase flood risk. Therefore, no significant effects are likely and these receptors are not considered further in this assessment.

7.4 Stakeholder engagement and consultation

- 7.4.1 Engagement in relation to air quality has been undertaken with a number of stakeholders. Engagement meetings with local authorities have been carried out over the past four years at key points where there was information ready to share and discuss. Open discussions with the environmental health officers at the local authorities has provided transparency for the assessment process and to gather local knowledge.
- 7.4.2 For air quality a working group was formed comprising representatives from:
- a. Luton Borough Council (LBC);
 - b. Central Bedfordshire Council (CBC);
 - c. North Hertfordshire District Council (NHDC);
 - d. Aylesbury Vale District Council (AVDC), now part of Buckinghamshire County Council (BCC);
 - e. St Albans District Council (SADC); and
 - f. Stevenage District Council (SDC).
- 7.4.3 The **2019 Statutory Consultation Feedback Report** contains a full account of the previous statutory consultation process and issues raised in feedback. Matters raised regarding the scope, method or mitigation being considered as part of the air quality assessment were then subject to further discussions directly with stakeholders during working group meetings. The main matters/themes raised during consultation considered relevant to the air quality assessment were:
- a. method of assessment including; assessment extent, receptor selection, and model verification;
 - b. mitigation options to minimise emissions associated with the airport; and
 - c. monitoring, existing and future requirements.
- 7.4.4 **Table 7.7** provides a summary of engagement with relevant stakeholders, undertaken to inform the EIA and this PEIR to date, including the date and time of meetings and a summary of discussions to resolve matters raised.

Table 7.7: Stakeholder engagement relating to air quality

Meeting name and date	Attendees (organisation)	Summary of discussion
Proposed Development-specific monitoring (various emails between February 2018 and January 2019)	LBC CBC NHDC The Applicant	The locations for Proposed Development-specific monitoring were discussed and agreed.
Environmental Health Officer (EHO) EIA Scoping Meeting 12 April 2018	NHDC CBC Apologies: LBC The Applicant	It was agreed that the LBC AQMAs (AQMA 1, 2 and 3), the CBC AQMA in Dunstable (AQMA 1) and the two NHDC AQMAs in Hitchin (Stevenage Road and Payne's Park) would be included in the assessment (see Figure 6.1, Volume 2 of the EIA Scoping Report (Appendix 1.2) if the traffic modelling data provided sufficient information.
Air Quality Technical Stakeholder Meeting 11 January 2019	LBC CBC NHDC Apologies: AVDC The Applicant	The general approach and method of assessment was agreed. This included considering the odour impact, specifically from the work involving the landfill at Wigmore Valley Park. The need for assessment of intermediate scenarios, before the full operational year, was also agreed. Consideration of freight traffic as a result of the airport was also agreed.
Air Quality Technical Stakeholder Meeting 7 June 2019	LBC NHDC Apologies: CBC AVDC The Applicant	Actions from the previous meeting were discussed. Comments on the EIA Scoping Report were discussed and the assessment scenarios and extent of the modelled road network was agreed. The methodology of assessment was also agreed.
Air Quality Technical Stakeholders – 2020	LBC NHDC CBC AVDC The Applicant	The air quality group members were kept in the loop regarding changes to the programme and scheme design during 2020 via email. No meetings were held due to the programme changes.
Air Quality Technical Stakeholder Meeting 26 April 2021	LBC NHDC CBC BCC SDC SADC	Changes since the previous designs that stakeholders had been shown were presented. The stakeholders were introduced to the Green Controlled Growth (GCG) programme and how that would feed into the application for development consent.

Meeting name and date	Attendees (organisation)	Summary of discussion
	The Applicant	<p>Technical air quality items from the statutory consultation were presented the following key points:</p> <ul style="list-style-type: none"> a. assessment methodology – clarifying use of AQ guidance and other bespoke aspects; b. study area clarification; c. future baseline clarification; d. fleet mix assumptions used for modelling future aviation and traffic emissions; e. predicted air quality effects; f. sensitivity testing undertaken; g. predicted cumulative effects; and h. proposed mitigation and monitoring measures and their securing mechanisms. <p>The methodology points were agreed by stakeholders. Actions from the meeting were around clarifying the highway interventions, traffic model reliability area, ARN and receptor selection.</p>
LBC EHO meeting 30 September 2021	LBC	Meeting to discuss ongoing and future monitoring locations.

7.4.5 Stakeholder engagement will continue as the Proposed Development progresses and will include further meetings with the air quality technical working group to discuss results of this PEIR and next steps for the ES.

7.5 Methodology

Overview

7.5.1 This section outlines the methodology employed for assessing the likely significant effects on air quality from the construction and operation of the Proposed Development. Full details of the methodology, including relevant assumptions and limitations, can be found in **Section 7.7** of **Appendix 7.1** in Volume 3 to this PEIR.

Baseline methodology

7.5.2 To provide an assessment of the significance of any new development proposal (in terms of air quality), it is necessary to identify and understand the baseline air quality conditions in and around the study area. The baseline year for this assessment is 2019. This provides a reference level against which any potential changes in air quality can be assessed. Since the baseline air quality is predicted to change in the future (mainly because vehicle emissions are changing and aircraft future fleets are expected to change), the future baseline situation has also been predicted for Phase 1 (2027), Phase 2a (2039) and Phase 2b (2043) to present a reasonable worst-case assessment. The do minimum (DM) scenario is the predicted future baseline for the relevant assessment years without the Proposed Development and includes any other proposed schemes with a high level of certainty of being built.

7.5.3 A desk-based review of the following data sources has been undertaken to determine baseline conditions of air quality in this assessment:

- a. Defra Air Quality Management Area (AQMA) website (Ref. 7.27);
- b. Data from monitoring surveys carried out by the local authority;
- c. Environment Agency Pollution Inventory website (Ref. 7.28);
- d. Geographic Information System (GIS) locations of sensitive receptors (residential properties, schools, hospitals and care homes) from Ordnance Survey (OS) Address Base Plus data and satellite imagery; and
- e. GIS boundaries of designated ecological sites from Natural England (Ref. 7.29).

7.5.4 A baseline monitoring survey to supplement the existing monitoring data is ongoing. Passive diffusion tubes at five locations are monitoring volatile organic compounds (VOCs). Passive diffusion tubes at 11 locations are monitoring NO₂ (see **Figure 7.2** in Volume 4 of this PEIR).

7.5.5 Monitoring has been set up at locations where there are gaps in the local authority monitoring around the airport, and at locations which could be used to support model verification.

7.5.6 An automatic monitoring station has been installed to monitor nitric oxide (NO) and nitrogen dioxide (NO₂), which are collectively referred to as NO_x, fine particulate matter (PM₁₀, PM_{2.5}, PM₁), ozone (O₃), sulphur dioxide (SO₂), benzene, carbon monoxide (CO), black carbon, VOCs, naphthalene and

toluene (see **Figure 7.2** in Volume 4 of this PEIR). This includes a range of potential pollutants wider than that monitored by any other major airport in the UK (Ref. 7.30).

- 7.5.7 The monitoring station collects data 24 hours a day, 7 days a week, 365 days per year (other than during any maintenance operations). The averaging time for each pollutant will be 1-hour or less, so that the station is not just recording daily, weekly or monthly averages, and the data could be used to assess the variation in concentration on an hourly basis.
- 7.5.8 The approach to defining future baseline is described in **Section 5.4** of **Chapter 5** of this PEIR. The future baseline considered for air quality is described **Section 7.7** of this chapter. The future baseline has been modelled using methodology detailed in **Appendix 7.1** in Volume 3 of this PEIR, referring to National Atmospheric Emissions Inventory (NAEI) gridded emissions (Ref. 7.31), and airport related emissions, calculated for the future baseline scenarios.
- 7.5.9 The odour baseline was assessed using sniff testing methodology detailed in **Appendix 7.1** in Volume 3 of this PEIR.

Construction assessment methodology

Construction dust

- 7.5.10 The effects from demolition and construction of the Proposed Development have been assessed using the qualitative approach described in the latest guidance by the IAQM (Ref. 7.21).
- 7.5.11 An 'impact' is described as a change in pollutant concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main impacts that may arise during demolition and construction of the Proposed Development are:
- a. dust deposition, resulting in the soiling of surfaces;
 - b. visible dust plumes; and
 - c. elevated PM₁₀ concentrations as a result of dust generating activities on site.
- 7.5.12 The IAQM guidance considers the potential for dust emissions from activities such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the site of the Proposed Development onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dust materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.
- 7.5.13 For each of these dust-generating activities, the guidance considers three separate effects:

- a. annoyance due to dust soiling;
- b. harm to ecological receptors; and
- c. the risk of health effects due to a significant increase in PM₁₀ exposure.

7.5.14 The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM₁₀ exposure.

7.5.15 The methodology takes into account the scale on which the above effects are predicted to be generated (classed as small, medium or large), the levels of background PM₁₀ concentration and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the Proposed Development. Suitable mitigation measures are also proposed to reduce the risk of the Proposed Development.

7.5.16 The full methodology for the assessment of construction dust is detailed in **Appendix 7.1** in Volume 3 of this PEIR.

Construction traffic

7.5.17 There will be off-site vehicle movements associated with the Proposed Development from deliveries and workers as detailed in **Appendix 7.1** in Volume 3 of this PEIR.

7.5.18 Impacts from changes to air pollutant concentrations as a result of additional road traffic have been predicted using Atmospheric Dispersion Modelling Software (ADMS). The specific dispersion model used was ADMS-Airport (Version 5.0.0.1) referred to as ADMS-Airport in this PEIR. The method of modelling, model verification and model set up are detailed in **Appendix 7.1** in Volume 3 of this PEIR.

7.5.19 The route taken by deliveries and workers is assumed to come directly from the M1 (split 50 percent north and south of Junction 10 of the M1) and travel up the A1081 to the airport, because it is the most direct route.

7.5.20 The construction traffic has been assessed in combination with operational traffic, because the phases assessed will have both construction and operational traffic occurring. The significance of effects has been calculated using the approach described in the IAQM/EPUK guidance (Ref. 7.22). The approach is detailed in **Appendix 7.1** in Volume 3 of this PEIR; it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

Construction equipment and plant

7.5.21 There will be construction equipment used such as Non-Road Mobile Machinery (NRMM) and a proposed concrete batching plant, which will have related emissions of NO_x, PM₁₀ and PM_{2.5}. The NRMM and batching plant impacts will be sufficiently mitigated by measures including, but not limited to, locating away from sensitive receptors, increasing the release height of emissions for sufficient dispersion (if necessary), and relevant abatement technology. The ES will contain an assessment of NRMM but it is not considered that emissions

from construction equipment and plant will materially change the conclusions in this PEIR.

Operational assessment methodology

- 7.5.22 A review of sources of emissions associated with the existing airport and the Proposed Development during operation has been carried out. Data was gathered for the following pollution sources and emissions have been assessed using dispersion modelling:
- aircraft main engines in the landing and take-off (LTO) phase, both at ground level and at height;
 - aircraft auxiliary power units (APUs);
 - ground support equipment (GSE), namely vehicles operating airside (airside of the terminal) which are associated with aircraft turn-around and runway maintenance;
 - other airport sources, such as ground power units (GPUs), energy and heating plant, fire training ground and engine testing;
 - landside (landside of the terminal building) road vehicles on the local highway network; and
 - all background sources that are non-airport and major road related that are included in the NAEI (e.g. domestic heating).
- 7.5.23 Regarding vehicles on the highway network, two sets of traffic data for each Phase were provided. One which considered the Local Transport Plans of relevant authorities (LTP traffic data) and one which used Web-based Transport Analysis Guidance (WebTAG) from Department for Transport (Core traffic data). Each of these have been assessed and results provided in **Appendix 7.1** in Volume 3 of this PEIR. Further details of the traffic growth options are provided in **Chapter 18** in Volume 2 of this PEIR.
- 7.5.24 The pollutants calculated were NO_x, NO₂, PM₁₀ and PM_{2.5}.
- 7.5.25 The ADMS-Airport dispersion model has been used for assessment of operational emissions. The model takes into account all the relevant emissions sources on and off the airport and can allow for variations of each of the emission sources with time. Annual mean concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} were estimated for comparison with the relevant air quality standards.
- 7.5.26 The initial air quality modelling included a verification of model-predicted concentrations against monitored values to determine whether the model output for future scenarios requires any adjustment to take into account systematic over- or under-predictions. Any required adjustment was then undertaken in accordance with Defra guidance (Ref. 7.20).
- 7.5.27 Pollutant concentrations have been predicted at a grid of receptors covering the 15km x 15km study area, and at discrete sensitive human and ecological receptors in the study area.

- 7.5.28 Full details of the modelling methodology and calculation of emissions along with any assumptions are provided in **Appendix 7.1** in Volume 3 of this PEIR .
- 7.5.29 The significance of effects has been calculated using the approach described in the IAQM/EPUK guidance (Ref. 7.22). The approach is detailed in **Appendix 7.1** in Volume 3 of this PEIR ; it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

Odour assessment methodology

- 7.5.30 During the proposed construction and earthworks, potentially contaminated soils and waste material may be exposed. This may temporarily generate potential dust and odours affecting human receptors off-site.
- 7.5.31 Odour is typically due to a mixture of substances and the odour impact of different substances cannot simply be added together. Dispersion modelling of the VOCs would therefore not enable an evaluation of significant effects associated with any increased emissions. Therefore, in accordance with IAQM guidance (Ref. 7.23), the assessment of odour under operational scenarios has been undertaken using a Source Pathway Receptor assessment and sniff testing.
- 7.5.32 Odour related to the construction works at Wigmore Valley Park disturbing historical landfill has been considered in this assessment, as well as potential sources of odour in the Proposed Development. A baseline survey has also been undertaken around the Proposed Development area which has also been included. The methodology is detailed in **Appendix 7.1**, in Volume 3 in this PEIR.

Health impact assessment methodology

- 7.5.33 It is acknowledged that there are no thresholds of effect at a population level identified for pollutants such as NO₂, PM₁₀ and PM_{2.5} (Ref. 7.32), so there are health benefits to be gained from improving air quality even at concentrations below the standards. However, in order to determine the significance of impacts, the current legislated standards have been used, in line with the best practice guidance (Ref. 7.22). Health impact assessments consider the impacts at a population level. The air quality assessment considers the population affected by significant concentrations by assessing the impact at sensitive receptors representative of the population (receptors nearest to the ARN, airport and below the flightpath). Therefore, the assessment has indicated the population affected by significant concentrations in **Section 7.9**. The results in **Section 7.9** have been considered in **Chapter 13** of Volume 2 of this PEIR.

7.6 Assumptions and limitations

- 7.6.1 This section provides a description of the assumptions and limitations to the air quality assessment.
- 7.6.2 A table summarising the assumptions required for the assessment is provided in **Appendix 7.1** in Volume 3 of this PEIR. Several assumptions have been

made where the data supplied was incomplete, in order to complete a robust assessment for this PEIR. Where possible these assumptions will be explored with owners of data provided, during assessment for the ES. The ES will contain a full method used to carry out the air quality assessment and an updated version of the assumptions and limitations table.

Reasonable Worst Case

7.6.3 **Chapter 5** describes the general approach adopted to ensure that a reasonable worst case is assumed in this assessment including the use of parameters, accounting for uncertainty, and incorporating flexibility in design and demand forecasts.

7.6.4 The following provides the relevant assumptions on the reasonable worst case specific to this assessment.

Construction phase

7.6.5 The construction phase has assumed worst case impacts for 'high risk' sites all the way to the Proposed Development boundary and all external construction traffic are Heavy Duty Vehicles (HDVs).

7.6.6 Due to the dynamic and transient nature of construction activities, the assessment of construction traffic emissions are based on the peak year of construction traffic that will occur during each construction phase.

7.6.7 The construction for each phase is expected to occur during the following periods:

- a. Phase 1 construction: 2025 to 2027. Peak construction traffic is expected in 2025;
- b. Phase 2a construction: 2033 to 2036. Peak construction traffic is expected 2035; and
- c. Phase 2b construction: 2037 to 2040. Peak construction traffic is expected 2039.

7.6.8 The construction traffic from the peak years for each phase has then been added to the operational traffic for the opening year of each phase (Phase 1: 2027 traffic; Phase 2a: 2039 traffic and Phase 2b: 2043 traffic). This approach ensures that any likely significant effects due to the combination of construction and operational activities are captured in the assessment and is considered to represent a reasonable worst case approach.

Operational phase

7.6.9 The following provides the relevant assumptions on the reasonable worst case specific to this assessment for the operational phase:

- a. assuming no improvement in vehicle fleets beyond 2030;
- b. assuming Terminal 2 will use combustion plant for heating;
- c. assuming there will be no increase in electric vehicles or reduced proportions of pre-Euro 6/VI vehicles in the GSE fleet;

- d. assuming GPU emission increase without consideration of Terminal 2 including Fixed Electric Ground Power; and
- e. assuming the future background concentration will stay constant at the 2019 modelled concentration based on NAEI emissions.

7.6.10 This approach is considered to represent a reasonable worst case for operational air quality. In addition, to ensure that the approach to defining a reasonable worst case is robust, sensitivity testing was undertaken to determine the potential for greater impacts if demand levels are achieved more quickly or slowly and having regard for the potential for delays to the transition to new aircraft. Sensitivity tests are discussed in **Section 7.9**.

7.7 Baseline conditions

7.7.1 This section provides a description of the existing and future air quality conditions in the study area. Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

Existing conditions

Sources of air pollution

7.7.2 A review of sources of air pollution in the study area identified there are no Part A1 industrial processes within 10km of the Proposed Development. Part A2 and Part B processes in the study area are not considered to be significant point sources of emissions and impacts from these sources is taken into account within the background concentrations included in the assessment.

7.7.3 All other key sources, roads, aircraft, airport operations have been explicitly assessed.

Local air quality management

7.7.4 The Environment Act 1995 (Ref. 7.5) required local authorities to review and assess air quality with respect to the standards for seven pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an assessment and an Annual Status Report (ASR). If the ASR identifies potential hotspot areas likely to exceed air quality standards, then a detailed assessment of those areas is required. Where standards are predicted not to be met, local authorities must declare the area as an AQMA. In addition, local authorities are required to produce an Air Quality Action Plan (AQAP) which includes measures to improve air quality within the AQMA.

7.7.5 Details of AQMAs declared in the study area are provided in **Table 7.8**. The location of the AQMAs in relation to the Proposed Development are shown in **Figure 7.3** in Volume 4 of this PEIR.

Table 7.8: AQMA details and NO₂ monitoring results

Details of AQMAs
<p>Luton AQMA 1 (in the 15x15km study area)</p> <p>Declared in 2003 due to exceedances of the NO₂ annual mean standard. The AQMA includes residential properties either side of the M1 motorway near Junction 11.</p> <p>There are two monitoring locations in the AQMA (LN15 and LN86). Luton AQMA 1 and Luton AQMA 2 overlap and therefore the two monitoring locations in Luton AQMA 1 are also located in Luton AQMA 2. No exceedances were recorded at LN15 of the NO₂ annual mean standard from 2013 to 2019. LN86 was installed in 2017 and recorded an annual mean NO₂ concentration of 39µg/m³ in 2019, which is below the annual mean standard.</p>
<p>Luton AQMA 2 (in the 15x15km study area)</p>

Details of AQMAs

Declared in 2005 due to exceedances of the NO₂ annual mean standard. The AQMA also includes residential properties either side of the M1 motorway near Junction 11, but south of AQMA 1.

There are nine monitoring locations in the AQMA (LN15 to LN18, LN81 to LN86). In 2019 none of the locations recorded exceedances of the NO₂ annual mean standard.

Luton AQMA 3 (in the 15x15km study area)

Declared in 2016 due to exceedances of the NO₂ annual mean standard. The AQMA extends from Dunstable Road (A505) near the junction with Kenilworth Road through to Stuart Street and Chapel Viaduct by Latimer Road, including Castle Street to Holly Street and Telford Way.

There are five monitoring locations in the AQMA (LN52, LN60 to LN63, LN66). LN52 and LN61 to LN63 have recorded exceedances in the years they have operated from 2013 to 2019.

CBC AQMA 1 Dunstable (in the 15x15km study area)

Declared in 2005 due to exceedances of the NO₂ annual mean standard. The AQMA extends from High Street North (A505), through Dunstable town centre to Borough Road (A5183). It also includes West Street (B489) from St Marys Gate, through the town centre to the junction of Church Street (A505), Poynters Road and Dunstable Road (A505).

There are seven monitoring sites in the AQMA (sites 1, 18, 27, 33, 34, 36 and 37) and three located close to the AQMA boundary (sites 50, 55 and 57). In 2019 sites 1 and 52 was recorded an exceedance of the annual mean standard (43.4 and 42.1 µg/m³ respectively).

NHDC AQMA Stevenage Road (in the 15x15km study area)

Declared in 2012 due to exceedances of the NO₂ annual mean standard. The AQMA is located along a section of Stevenage Road, Hitchin and includes properties on the south side of the road.

There are eight diffusion tube monitoring sites in the AQMA (NH45, NH92, NH103 to NH105, NH110 to NH112). Sites NH110, NHG111 and NH112 recorded exceedances of the NO₂ annual mean standard, which range from 42 µg/m³ to 49 µg/m³.

NHDC AQMA Paynes Park (in the 15x15km study area)

Declared in 2017 due to exceedances of the NO₂ annual mean standard. The AQMA is located along the roads surrounding Paynes Park Roundabout in Hitchin.

There is one monitoring location in the AQMA (NH93) which recorded an exceedance of the annual mean standard in 2019 (41.9 µg/m³).

St Albans City and District Council AQMA No. 2 (on the extended road network outside of the 15x15km study area)

Declared in 2004 due to exceedances of the NO₂ annual mean standard. The AQMA is located 15km south of the airport, along the M1. There is one roadside monitoring location in the AQMA (SA142) at the relevant residential receptor, which was installed in 2017. The site recorded 30.4 µg/m³ in 2019 which is below the annual mean standard.

Local monitoring data

- 7.7.6 Details of air quality monitoring in the study area including scheme specific monitoring and monitoring carried out by London Luton Airport Operations Ltd (LLAOL) (the current operator of the airport) and local authorities are provided in **Appendix 7.2** (Volume 3 of this PEIR).
- 7.7.7 Monitoring close to the airport has identified a number of locations exceeding the air quality standard for annual mean NO₂, however none of the locations are representative where people would be exposed for durations relevant to the annual mean standard. All locations representative of receptors sensitive to long-term exposure to NO₂, are below the air quality standard for annual mean NO₂. Monitoring of NO₂ across the study area identified a number of locations in existing AQMAs where concentrations exceed the annual mean air quality standard. No automatic monitoring sites recorded any exceedances of the short term NO₂ standard and no diffusion tubes in the study area recorded concentrations above 60µg/m³ (the value which could indicate risk of exceedance of the short-term standard).
- 7.7.8 All concentrations of PM₁₀ and PM_{2.5} recorded were below the relevant standards in 2019.
- 7.7.9 All concentrations of VOCs were well below the relevant standards in the study area.
- 7.7.10 All other concentrations of pollutants monitored (SO₂, CO) were well below the relevant standards, other than for O₃ where one exceedance of a short-term standard was noted. This was the short-term standard for ozone. However, ozone is a trans-boundary pollutant which is formed in the atmosphere from reactions involving other pollutants. Monitoring from across the UK has shown similar results and it can be concluded that this exceedance is not attributed to a local source.
- 7.7.11 In summary NO₂ is the only pollutant influenced by local sources of emissions which is exceeding the standards in the study area.

Background concentrations

- 7.7.12 The background air quality has been modelled using rural background concentrations and gridded emissions. Details of the gridded emissions are provided in this section.
- 7.7.13 Background concentrations refer to the existing levels of pollution in the atmosphere, produced by a variety of stationary and nonstationary sources, such as roads and industrial processes.
- 7.7.14 An inventory of background emissions was compiled using gridded pollutant emissions. The data was taken from the NAEI. The data was in the form of gridded emissions for 1x1km squares, broken down by pollutant and by sector. The emissions were modelled using ADMS-Airport over a 60km by 50km grid area (centred on the study area) at a 1km resolution, to model the impact of diffuse sources on background concentrations in the vicinity of the airport. ADMS-Airport can model up to 3,000 1km grid cells; it is considered this area is

sufficient to capture all background effects that would influence the background concentrations in the 15km by 15km study area. The resulting background concentrations were then added to concentrations recorded at rural background monitoring stations to generate hourly varying total background concentrations for the study area.

- 7.7.15 Three rural background monitoring stations were selected for the modelling of background NO_x: Wicken Fen 65km to the north east, Rochester Stoke approximately 85km to the south east, and Chilbolton 110km to the south west of the airport respectively. For the modelling of background PM, two rural background monitoring stations were selected: Rochester Stoke and Chilbolton. These were selected as the nearest sites with suitable data capture. These are part of Defra's automatic urban and rural network (AURN) for monitoring.
- 7.7.16 The contribution of rural monitoring data to the background concentration was made on an hourly basis depending on wind direction. For background modelling of NO_x, when the wind was from the north east, the background NO_x data from Wicken Fen was used; when the wind was from the south east, the background NO_x data from Rochester Stoke was used; and when the wind was from the south west, the background NO_x data from Chilbolton was used. For background modelling of PM, when the wind was from the east, the background PM and ozone data from Rochester Stoke was used; and when the wind was from the west, the background PM and ozone data for Chilbolton was used.
- 7.7.17 **Figure 7.4** in Volume 4 of this PEIR shows the location of AURN sites selected and the NAEI gridded emissions area.
- 7.7.18 The modelled background concentrations for 2019 were compared with the measured concentrations from the urban background monitoring stations carried out by LBC for 2019. Site suitability was assessed and only sites where the location was confirmed, and it was considered concentrations were not influenced by a specific source, were selected.
- 7.7.19 **Appendix 7.2** in Volume 3 of this PEIR provides the results of the comparison which show there is a good agreement between modelled and monitored background concentrations.

Odour baseline

- 7.7.20 Sniff testing around the Proposed Development area was undertaken to assess the odour risk from potential sources. The details of the methodology and results are provided in **Appendix 7.1** and **Appendix 7.3** in Volume 3 of this PEIR, respectively.

Future baseline

- 7.7.21 In the absence of the Proposed Development, there is likely to be a change to the future baseline conditions as a result of other factors and developments in proximity. These are the conditions that will prevail 'Without Development' in place. The 'Without Development' scenario is used, where appropriate, as a comparator for the assessed case, to show the effect of the Proposed Development against an appropriate reference point. The approach to defining

future baseline and the developments identified for consideration are described in **Section 5.4** of **Chapter 5** of this PEIR.

- 7.7.22 The future traffic data along the road network 'Without Development' has been modelled along with airport sources based on the ATMs fleet forecasts 'Without Development'. The background emissions modelling for 2019 have been used for the future scenarios. The total of these modelling results provides the future baseline concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5}.

7.8 Embedded and good practice mitigation measures

- 7.8.1 This section describes the embedded and good practice mitigation for air quality that has been incorporated into the Proposed Development design or assumed to be in place before undertaking the assessment. A definition of these classifications of mitigation and how they are considered in the EIA is provided in **Chapter 5** of this PEIR.

Embedded

- 7.8.2 A summary of measures that have been embedded into the design of the Proposed Development are set out below.
- 7.8.3 This section outlines the embedded mitigation which has been assumed to be in place for the purpose of this assessment. The assumptions have been made based on data gathered to date, an understanding of the Proposed Development, and experience of other aviation projects.
- 7.8.4 Embedded mitigation for construction includes:
- a. phased working to reduce the magnitude and extent of air quality impacts in comparison to undertaking all works at the same time; and
 - b. odorous material will be covered over regularly if works are on-going to avoid release of unpleasant odours.
- 7.8.5 Embedded mitigation for operation includes:
- a. use of the new Airport Access Road (AAR) to provide routes for operational road traffic and construction traffic, away from sensitive receptors; and
 - b. the Proposed Development includes a new fuel pipeline connection which will reduce the number of heavy goods vehicles (HGVs) delivering fuel to Proposed Development, and the related emissions.

Good Practice

- 7.8.6 Good practice for construction is to follow the IAQM guidance for control of dust and construction emissions. Construction good practice measures are given in the Draft Code of Construction Practice (CoCP) in **Appendix 4.2** in Volume 3 of this PEIR and in the Draft Air Quality Plan in **Appendix 7.4** of Volume 3.
- 7.8.7 Operational good practice mitigation measures are also recommended in the Draft Air Quality Plan (**Appendix 7.4** of Volume 3). Good practice for the operational phase is to consider how to reduce road transport movements as far

as possible; provide and incentivise use of electric vehicles; and to monitor air quality around the airport.

7.9 Preliminary assessment

- 7.9.1 This section presents the results for the preliminary assessment of the Core Planning Case for likely significant effects with the embedded and good practice mitigation measures, described in the previous section, in place. Results for the faster growth scenarios are provided in **Section 7.9.36**.
- 7.9.2 The results are summarised here for each phase, with consideration of the results from modelling the Core traffic data and LTP traffic data.
- 7.9.3 A summary of the assessment of effects is provided on **Table 7.12** in **Section 7.14**. The effects are discussed in further detail in this section.

Construction effects

Construction dust

- 7.9.4 The construction effects from Phase 1, Phase 2a and Phase 2b have been assessed following the IAQM methodology (Ref. 7.21). The level of dust risk to dust soiling and human health during each phase has been summarised in **Table 7.9**.
- 7.9.5 Due to the risks identified, without applying mitigation measures, there would be potential for a **significant effect**. Therefore, mitigation measures for high risk sites have been set out in the Draft CoCP provided as **Appendix 4.2** in Volume 3 of this PEIR, and it is recommended that the high risk mitigation measures are considered during all three phases. These measures are considered to be good practices and following the implementation of this appropriate mitigation, the effects of construction on dust soiling and human health should be **negligible** and the impacts would therefore **not be significant**, in line with IAQM guidance (Ref. 7.21).

Table 7.9: Summary of construction dust effects

Phase	Dust soiling	Human health
Phase 1	Medium	Low
Phase 2a	High	Low
Phase 2b	High	Low

Construction equipment and plant

- 7.9.6 NRMM and any potential batching plant have not been assessed as described in **Section 7.5**. However, impacts will be sufficiently mitigated by measures including, but not limited to, locating away from sensitive receptors, increasing the release height of emissions for sufficient dispersion, and relevant abatement technology. Therefore, it is not considered that emissions from construction equipment and plant will not materially change the conclusions in this PEIR. The assessment from these sources will be assessed in the ES.

Phase 1

Operational effects

Modelled concentrations at human receptors

- 7.9.7 Full results for both Core traffic data and LTP traffic data are provided in **Appendix 7.3** in Volume 3 of this PEIR. The worst case results occur with the Core traffic data and are summarised below.
- 7.9.8 Pollutant concentrations for annual mean NO₂ predicted at 479 sensitive human receptors (including the heritage receptors) resulted in a predicted **negligible** magnitude of change for 478 receptors, and **slight adverse** impacts at one receptor.
- 7.9.9 The receptor (H133) where a slight adverse impact was predicted, was located on the Dunstable Road (A505) at the Poynters Road Roundabout. The change in concentrations predicted at this receptor was 0.8µg/m³ with a maximum total concentration of 32.1µg/m³, which is below the annual mean standard (40µg/m³). As detailed in **Appendix 7.1** the change is considered to be **slight adverse** as the total concentration at this location is 78% of the air quality standard and the change is 2% of the air quality standard. This was also the maximum predicted change at all receptors assessed.
- 7.9.10 No locations are predicted to exceed the annual mean standard in 2027. The maximum predicted concentration was 33µg/m³ at receptor H414 adjacent to the M1.
- 7.9.11 Changes to annual mean PM₁₀ and PM_{2.5} are predicted to be **negligible** at all receptors and all concentrations are below the air quality standards.
- 7.9.12 Therefore, the effects of NO₂, PM₁₀ and PM_{2.5} at human receptors, as a result of the proposed development, are predicted to be **not significant**.

Modelled concentrations at ecological receptors

- 7.9.13 Full results for both Core traffic data and LTP traffic data are provided in **Appendix 7.3** in Volume 3 of this PEIR. The worst case results occur with the core traffic data and are summarised below.
- 7.9.14 Pollutant concentrations for annual mean NO_x are predicted at 36 sensitive ecological receptors, seven receptors are predicted to experience concentrations above the annual mean standard of 30µg/m³. These concentrations occur in both the with and without Proposed Development scenarios. The change in annual mean NO_x is negligible for six of the sites with E22 (Kidney/ Bulls Ancient Woodland) having a change of 1.6µg/m³. As this change is greater than 1% of the critical level the results have been passed to the project ecologist to determine significance, in line with the methodology detailed in **Appendix 7.1** in Volume 3 of this PEIR.
- 7.9.15 The change in nitrogen deposition at each ecological site have also been calculated and the change as a result of the Proposed Development is above 1% of the lower critical load at E22 (Kidney/ Bulls Ancient Woodland) and E36

(Winchill Ancient Woodland) where there is a change as the percentage of the critical load of 2.7% and 2.1% respectively. As this change is greater than 1% of the critical load the results have been passed to the project ecologist to determine significance. All other sites have a change of less than 1% compared to the lower critical load and are therefore considered to be insignificant.

- 7.9.16 The significance of changes at Kidney/ Bulls Ancient Woodland and Winch Hill Ancient Woodland are evaluated in **Section 8.9 of Chapter 8** in Volume 2 of this PEIR and are considered to be **not significant**.

Odour effects

- 7.9.17 The Source Pathway Receptor assessment predicted a maximum of a medium odour risk from the apron as a result of aircraft emission and from potential odours from the works at the historical landfill. The baseline sniff testing results found negligible odour effects suggesting the airport is **not a significant** source of odour. Full details are provided in **Appendix 7.3** in Volume 3 of this PEIR. Best practice measures to mitigate odours from the airport are also provided in the Draft Air Quality Plan (**Appendix 7.4** in Volume 3 of this PEIR).
- 7.9.18 The landfill odours will be mitigated by the measures provided in the Draft CoCP provided as **Appendix 4.2** of Volume 3 of this PEIR.

Phase 2a

Operational effects

- 7.9.19 Full results for both Core traffic data and LTP traffic data are provided in **Appendix 7.3** in Volume 3 of this PEIR. The worst case results occur with the Core traffic data and are summarised below.
- 7.9.20 Pollutant concentrations for annual mean NO₂ predicted at 479 sensitive human receptors (including the heritage receptors) resulted in a predicted **negligible** magnitude of change for all 479 receptors.
- 7.9.21 The receptor (H299) where the maximum impact was predicted, was located on Dane Street, south of the runway. The change in concentrations predicted at this receptor was 1.5µg/m³ with a maximum total concentration of 18.3µg/m³, which is below the annual mean standard (40µg/m³).
- 7.9.22 No locations are predicted to exceed the annual mean standard in 2027. The maximum predicted concentration was 33µg/m³ at receptor H414 adjacent to the M1.
- 7.9.23 Changes to annual mean PM₁₀ and PM_{2.5} are predicted to be **negligible** at all receptors and all concentrations are below the air quality standards.
- 7.9.24 Therefore, the effects of NO₂, PM₁₀ and PM_{2.5} at human receptors, as a result of the Proposed Development, are predicted to be **not significant**.

Modelled concentrations at ecological receptors

- 7.9.25 Full results for both Core traffic data and LTP traffic data are provided in **Appendix 7.3** in Volume 3 of this PEIR. The worst case results occur with the core traffic data and are summarised below.
- 7.9.26 Pollutant concentrations for annual mean NO_x are predicted at 36 sensitive ecological receptors, seven receptors are predicted to experience concentrations above the annual mean standard of 30µg/m³. These concentrations occur in both the with and without Proposed Development scenarios. The change in annual mean NO_x is **negligible** for five of the sites with E18 (Chalk Wood Ancient Woodland) and E22 (Kidney/ Bulls Ancient Woodland) having a change of 1.5µg/m³ and 2.3µg/m³ respectively. As this change is greater than 1% of the critical level the results have been passed to the project ecologist to determine significance, in line with the methodology detailed in **Appendix 7.1** in Volume 3 of this PEIR.
- 7.9.27 The change in nitrogen deposition at each ecological site have also been calculated and the change as a result of the Proposed Development is above 1% of the lower critical load at eight receptor locations listed here:
- E14 Field Maple (change of 1.4% of lower critical load);
 - E18 Chalk Wood (change of 2.7% of lower critical load);
 - E22 Kidney/Bulls Wood (change of 3.8% of lower critical load);
 - E28 Burnwell Spinneys (change of 1.2% of lower critical load); and
 - E36 Winchill Wood (change of 3.2% of lower critical load).
- 7.9.28 As these changes are greater than 1% of the critical level the results have been passed to the project ecologist to determine significance. All other sites have a change of less than 1% compared to the lower critical load and are therefore considered to be **insignificant**.
- 7.9.29 The significance of changes are evaluated in **Section 8.9 of Chapter 8** in Volume 2 of this PEIR and are considered to be **not significant**.

Odour effects

- 7.9.30 The Source Pathway Receptor assessment predicted a maximum of a medium odour risk from the apron as a result of aircraft emission (changes to the apron), the new fuel farm to the east of the apron, and from potential odours from the works at the historical landfill. The baseline sniff testing results found negligible odour effects suggesting the airport is **not a significant** source of odour. Full details are provided in **Appendix 7.3** in Volume 3 of this PEIR. Best practice measures to mitigate odours from the airport are also provided in the Draft Air Quality Plan (**Appendix 7.4** in Volume 3 of this PEIR).
- 7.9.31 The landfill odours will be mitigated by the measures provided in the Draft CoCP provided in **Appendix 4.2** in Volume 3 of this PEIR.

Phase 2b

Operational effects

Modelled concentrations at human receptors

- 7.9.32 Full results are provided in **Appendix 7.3** in Volume 3 of this PEIR.
- 7.9.33 Pollutant concentrations for annual mean NO₂ predicted at 479 sensitive human receptors (including the heritage receptor) resulted in a predicted **negligible** magnitude of change for 478 receptors, and **slight adverse** impacts at one receptor.
- 7.9.34 The receptor (H299) where a **slight adverse** impact was predicted, was located on Dane Street, south of the runway. The change in concentrations predicted at this receptor was 3.0µg/m³ with a maximum total concentration of 20.1µg/m³, which is below the annual mean standard (40µg/m³). As detailed in **Appendix 7.1** the change is considered to be **negligible** as the total concentration at this location is 50% of the air quality standard and the change is 8% of the air quality standard. This was also the maximum predicted change at all receptors assessed.
- 7.9.35 All concentrations predicted at future receptors are below the annual mean standard (40µg/m³). The maximum predicted concentration was 31.5µg/m³ at receptor H414 adjacent to the M1.
- 7.9.36 Changes to annual mean PM₁₀ and PM_{2.5} are predicted to be **negligible** at all receptors and all concentrations are below the air quality standards.
- 7.9.37 Therefore, the effects of NO₂, PM₁₀ and PM_{2.5} at human receptors, as a result of the Proposed Development, are predicted to be **not significant**.

Modelled concentrations at ecological receptors

- 7.9.38 Full results for both Core traffic data and LTP traffic data are provided in **Appendix 7.3** in Volume 3 of this PEIR. The worst case results occur with the Core traffic data and are summarised below.
- 7.9.39 Pollutant concentrations for annual mean NO_x are predicted at 36 sensitive ecological receptors, seven receptors are predicted to experience concentrations above the annual mean standard of 30µg/m³. These concentrations occur in both the with and without Proposed Development scenarios. The change in annual mean NO_x is negligible for five of the sites with E18 (Chalk Wood Ancient Woodland) and E22 (Kidney/ Bulls Ancient Woodland) having a change of 0.8µg/m³ and 3.3µg/m³ respectively. As these changes are greater than 1% of the critical level the results have been passed to the project ecologist to determine significance.
- 7.9.40 The change in nitrogen deposition at each ecological site have also been calculated and the change as a result of the Proposed Development is above 1% of the lower critical load at eight receptor locations listed here:
- a. E18 Chalk Wood (change of 1.4% of lower critical load);

- b. E22 Kidney/Bulls Wood (change of 5.5% of lower critical load);
- c. E23 George Woods (change of 1.5% of lower critical load);
- d. E25 Subbocks Wood (change of 1.6% of lower critical load);
- e. E26 Furzen Wood (change of 1.1% of lower critical load);
- f. E27 Slaughters Wood (change of 1.5% of lower critical load);
- g. E28 Burnwell Spinneys (change of 1.6% of lower critical load); and
- h. E36 Winchill Wood (change of 7.6% of lower critical load).

7.9.41 As this change is greater than 1% of the critical level the results have been passed to the project ecologist to determine significance. All other sites have a change of less than 1% compared to the lower critical load and are therefore considered to be **insignificant**.

7.9.42 The significance of changes at sites with a change greater than 1% are evaluated in **Section 8.9 of Chapter 8** in Volume 2 of this PEIR and are considered to be **not significant**.

Odour effects

7.9.43 The Source Pathway Receptor assessment predicted a maximum of a medium odour risk from the apron as a result of aircraft emission (relocating the ERUB to the final location and changes to the apron), the new fuel farm to the east of the apron and the new fire training ground south of the runway. The baseline sniff testing results found negligible odour effects suggesting the airport is not a significant source of odour. Full details are provided in **Appendix 7.3** in Volume 3 of this PEIR. Best practice measures to mitigate odours from the airport are also provided in the Draft Air Quality Plan (**Appendix 7.4** in Volume 3 of this PEIR).

Sensitivity Analysis

7.9.44 There are certain known scenarios or risks that may occur that could influence the conclusions of the core assessment. These scenarios and the general approach to considering them in this assessment are described in **Section 5.4 of Chapter 5** of this PEIR.

7.9.45 **Table 7.10** provides the qualitative and quantitative assessments undertaken of any likely changes to the conclusions of the assessment reported in this chapter, in the event that that scenario or risk is realised.

Table 7.10: Qualitative Sensitivity Analysis

Sensitivity scenario	Potential impact and change	Likely effect
1.19 mppa Application	The increase in capacity from 18 mppa (currently assessed) to 19 mppa may potentially increase the concentrations of the future baseline scenarios as a result of increased	The likely effect is that there will be a reduced change between the DM and DS scenario as a result of Proposed Development.

Sensitivity scenario	Potential impact and change	Likely effect
	emissions related to increased activity.	
2.Faster growth	<p>The passenger demand rises quicker than predicted in core demand forecast. This would mean increases of ATMs and traffic earlier than anticipated.</p> <p>With regards to ATMs, the Phases assessed corresponding to the air quality assessment years of 2027, 2039 and 2043 are predicted to increase in ATMs by 2.2%, 2.7% and 0.2% respectively.</p> <p>Phase 1 in the faster growth scenario (23 mppa) is predicted to be reached by 2029 (an increase in ATMs of 6% to corresponding core scenario year); similarly, Phase 2a (27 mppa) is predicted to be reached by 2038 (6% increase) and Phase 2b (32 mppa) is predicted to be reached by 2042 (7% increase).</p> <p>With regards to road traffic, the assessment uses emission factors from Defra (Ref. 7.33) which only predict up to 2030. It is unknown how the traffic volumes will change, but it is assumed the changes will be small following the small percentage increases in the ATMs.</p> <p>The construction programme would remain the same, therefore the construction impacts would not change.</p>	<p>A quantitative assessment of the 2027 assessment year using the ATMs for faster growth has been undertaken. The airport related road traffic for the core growth scenario was increased based on the increase in capacity between the core 2027 scenario and core faster growth scenario (an increase of 2%). The results of this assessment did not change the conclusions summarised above for the core scenario. The effect was predicted to be not significant. The results are provided in Appendix 7.3 in Volume 3 of this PEIR.</p> <p>The effect of the small ATM increases suggest it would be likely that the effect of reaching capacities earlier will be minor, considering also that traffic emissions assessed for the Phase 2a and 2b scenarios are modelled with emissions based on a 2030 fleet mix which would have a lower proportion of cleaner and electric vehicles than would be expected by 2039 and 2043, and construction impacts will not be affected.</p>
3.Slower growth	<p>The lower rate of forecast passengers would mean that increases of ATMs and traffic would occur later. Further into the future, road vehicle fleets are predicted to be less polluting as predicted by Defra (Ref. 7.33). Therefore there will be a reduced impact from the traffic generated by the proposed development.</p>	<p>It is likely there will be a reduced effect as a result of the Proposed Development as the changes to emissions is likely to be reduced in comparison to the core assessment. This is a result of capacity being unlocked later and fleets are predicted to be less polluting in the future</p>

Sensitivity scenario	Potential impact and change	Likely effect
4, A321Neo acoustic performance	Not relevant to air quality, no change.	Not relevant to air quality, no change.
5.Next generation aircraft	An alternative long term fleet mix has been prepared which takes into account the next generation of aircraft (rather than existing new generation, such as the Max and Neo), which would have better environmental performance. These aircraft are expected to be zero emissions in flight and therefore the likely change would be a decrease in aircraft emissions in comparison to the core assessment.	It is likely there will be a reduced effect as a result of the Proposed Development as the changes to emissions to be reduced in comparison to the Core Planning Case assessment.

7.10 Additional mitigation

7.10.1 This section describes the mitigation measures identified as a result of the assessment process, that are proposed in addition to those already considered to be in place as described in **Section 7.8** Embedded and good practice mitigation measures. These are proposed to reduce or mitigate the effects on air quality as a result of the construction and operation of the Proposed Development.

7.10.2 **Appendix 7.4** of Volume 3 of this PEIR includes mitigation measures in the Draft Air Quality Plan.

Design

7.10.3 There are no aspects that are in 'outline design' and require additional mitigation as part of detailed design, with regards to air quality.

Construction

7.10.4 Mitigation has been identified as required with respect to the construction dust effects. However, the measures are considered good practice and therefore not additional mitigation required.

7.10.5 Further measures beyond those good practices required to mitigate impacts have been considered including options to reduce on-site emissions from equipment and diesel generators are becoming more readily available and affordable in the market. With planning it is possible to achieve significant reductions in on-site emissions during the construction phase. Given the size of the works and duration it is recommended that targets for the reduction of emissions on-site are written into environmental procurement requirements and a monitoring regime established to assess the effectiveness and application of emission saving measures. This has been secured in the Draft Air Quality Plan in **Appendix 7.4** in Volume 3 of this PEIR.

7.10.6 As contaminated materials may be excavated during construction of the Proposed Development, excavated materials could contain odorous materials. Measures have been provided for the lead contractors to implement to minimise the risk of odour generation. These are provided in the Draft CoCP in **Appendix 4.2** of Volume 3 of this PEIR.

Operation

7.10.7 No significant impacts are predicted as a result of the Proposed Development, however it is recommended to continue to monitor air quality around the airport; to maintain an air quality emissions inventory and track implementation of the air quality action plan measures and report on the above on an annual basis. These recommendations are described in the Draft Air Quality Plan in **Appendix 7.4** of this PEIR, which will likely be secured by Requirement of the DCO. The Draft Air Quality Plan is supplemented with the **Draft Green Controlled Growth Proposals (GCG)** as the Draft Air Quality Plan sets the planned mitigation and the GCG will provide the mechanism for future review and would be responsible for implementation of future action if required.

7.11 Residual effects

Construction

- 7.11.1 No additional mitigation has been proposed with respect to construction related air quality effects. As such the effects would be as reported in **Section 7.9**.

Operation

- 7.11.2 No additional mitigation has been proposed with respect to operational air quality effects. As such the effects would be as reported in **Section 7.9**.

7.12 In-combination climate change effects

- 7.12.1 This section provides a preliminary assessment of potential changes to the findings of the air quality assessment, taking into account the predicted future conditions as a result of climate change, known as In-combination Climate Change Impacts (ICCI).
- 7.12.2 This assessment has been undertaken using the methodology and climate change predictions described in **Chapter 9** of this PEIR. The results are provided in **Table 7.11**.

Table 7.11: Air quality in-combination climate change impacts

Climate hazard	Likely ICCI	Consequence of ICCIs considering embedded environmental measures/good practice	Significance of ICCI effects
Increased number of hot days; increase of droughts.	Increased dust production during construction due to extended dry spells.	During the construction phase, extended dry spells may cause increased dust production. This consequence would be minimised as far as reasonably practicable, through the measures incorporated into the Draft CoCP (e.g. reduce dust emissions through the effective transportation and storage of materials), including the proposed monitoring regime.	Not significant
Increased number of hot days.	Hotter and drier / drought conditions could change concentrations of certain air pollutants such as NO _x , PM _{2.5} , PM ₁₀ and ozone (O ₃).	It is unlikely that hotter and drier / drought conditions will exacerbate concentrations of NO _x , PM _{2.5} and PM ₁₀ because aircraft engines and ground transportation, such as cars, are expected to be cleaner in the future. This is because aircraft engines will comply with emission standards set by the Committee on	Not significant

Climate hazard	Likely ICCI	Consequence of ICCIs considering embedded environmental measures/good practice	Significance of ICCI effects
		<p>Aviation Environmental Protection (CAEP) (Ref. 7.34) and there will be improvements in road vehicle technology and changes in fleet composition with higher proportion of low emission vehicles.</p> <p>O₃ is likely to increase and consequently affect NO₂ concentrations but there are limited mitigation measures available to the Applicant.</p>	
Increased number of hot days.	Hotter conditions could increase aircraft emissions due to the steeper required climb angle.	It is unlikely that conditions will exacerbate emissions because aircraft engines are expected to be cleaner in the future.	Not significant
Increased number of hot days.	Changes in wind speed and direction could influence local pollutant levels.	<p>There is considerable uncertainty in projections for changes in wind speed and wind direction, and studies show statistically insignificant variation in wind speed (Ref. 7.35). Monitoring measures are already in place.</p> <p>If there is increased channelling due to changes in wind direction this would increase annual average levels at some receptors and decrease them at others.</p> <p>However, by 2039</p>	Not significant

Climate hazard	Likely ICCI	Consequence of ICCIs considering embedded environmental measures/good practice	Significance of ICCI effects
		emissions from all sources and hence concentrations are likely to decrease.	

7.13 Monitoring

Construction monitoring

7.13.1 Monitoring for high risk sites would include the following measures as set out in the Draft CoCP in **Appendix 4.2** in Volume 3 of this PEIR:

- a. undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary;
- b. carry out regular site inspections to monitor compliance with the dust management plan, record inspection results, and make an inspection log available to the local authority when asked;
- c. increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and
- d. agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Operational monitoring

7.13.2 Monitoring of air quality will continue during the operational phase to assess changes to air quality which may be as a result of the Proposed Development.

7.14 Preliminary assessment summary

7.14.1 **Table 7.12** provides a summary of the identified impacts, mitigation and likely effects of the Proposed Development on air quality. Additional mitigation and how it will be secured are described and its efficacy shown by the reported residual effect.

Table 7.12: Air quality preliminary assessment summary

Impact	Embedded/Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
Construction						
Construction dust	Construction dust management. Application of best practice mitigation measures secured through the Draft CoCP.	Low	High	Not significant	Further measures advised will be secured through the Draft Air Quality Plan.	n/a
Construction traffic	Use of AAR and A1081 to the M1 and not using roads near to receptors. Secured through construction traffic controls in Draft CoCP and the Construction Traffic Management Plan which is appended to the Draft CoCP.	Negligible	High	Not significant	n/a	n/a
Operation						
Increased emissions to air from airport sources to human receptors	Draft Air Quality Plan measures.	Negligible	High	Not significant	n/a	n/a

Impact	Embedded/Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
Increased emissions to air from road traffic at human receptors	Draft Air Quality Plan measures.	Negligible	High	Not significant	n/a	n/a
Increased emissions to air from airport sources to ecological receptors	Draft Air Quality Plan measures.	Moderate adverse	High	Significant	Management of woodland for improvement in condition over a 50 year period, as per the Draft LBMP (Appendix 8.2 , Volume 3 of this PEIR).	Temporary moderate adverse effect in the short term, falling to a minor adverse impact in the long term, which is not significant once the management practices implemented shows improvement in the woodland condition overall.
Increased emissions to	Draft Air Quality Plan measures.	Moderate adverse	High	Significant	Management of woodland	Temporary moderate

Impact	Embedded/Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
air from road traffic at ecological receptors					for improvement in condition over a 50 year period, as per the Draft LBMP (Appendix 8.2 , Volume 3 of this PEIR).	adverse effect in the short term, falling to a minor adverse impact in the long term, which is not significant once the management practices implemented shows improvement in the woodland condition overall.

7.15 Completing the assessment

7.15.1 The following activities will be undertaken to complete the assessment, the results of which will be presented in the ES:

- a. assessment of change in concentrations predicted to occur as a result of the Proposed Development. The changes in pollutant concentrations where the population would be exposed will be assessed by identifying the number of properties exposed to changes within bands based on a percentage of the relevant annual mean standards;
- b. assessment of NRMM and any proposed batching plant to be used in the construction of the Proposed Development;
- c. appropriately consider the potential impact from ammonia (NH₃) where necessary and required, as a result of the Proposed Development;
- d. a sensitivity test using terrain data in the modelling to determine the impacts of considering the topology in the vicinity of receptors and the airport; and
- e. contour plots to visualise the total concentrations predicted in each phase.

COMPETENT EXPERTS

Topic	Role	Company	Qualifications/competencies/experience of author
Air Quality	Author	Arup	MSc Health and the Environment 6 years of experience Member of the Institute of Air Quality Management Associate Member of Institute of Environmental Sciences Air Quality Specialist
Air Quality	Technical review	Arup	MSc Environmental Analysis and Assessment 13 years of experience Chartered Environmentalist Chartered Scientist Member of the Institute of Air Quality Management Member of Institute of Environmental Sciences Air Quality Specialist
Air Quality	Contributor	Arup	MSc Environmental Technology 3 years of experience Associate Member of the Institute of Air Quality Management Associate Member of Institute of Environmental Sciences Graduate Member of Institute of Environmental Management and Assessment Air Quality Specialist

GLOSSARY AND ABBREVIATIONS

Term	Definition
AADT	Annual Average Daily Traffic
AAR	Airport Access Road
ADMS	Atmospheric Dispersion Modelling System
AEDT	Aviation Environmental Design Tool
ANPS	Airports National Policy Statement
APIS	Air Pollution Information System
APU	Auxiliary Power Units
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
ARN	Affected Road Network
ASR	Annual Status Report (related to air quality)
ATM	Air Transport Movements
AURN	Automatic Urban and Rural Network
AVDC	Aylesbury Vale District Council
AW	Ancient Woodland
BDC	Buckinghamshire District Council
CBC	Central Bedfordshire Council
CO	Carbon monoxide
CoCP	Code of Construction Practice
Defra	Department for Environment Food & Rural Affairs
DM	Do-Minimum
DMP	Dust management plan
DMRB	Design Manual for Roads and Bridges
DS	Do Something = an assessment scenario describing the conditions with the Proposed Development in place
DT	Diffusion tube
EFT	Emissions factor toolkit
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
ES	Environmental Statement
FOCA	Swiss Federal Office of Civil Aviation
FOI	Swedish Defence Research Agency
GIS	Geographic Information System
GPU	Ground Power Units
GSE	Ground Support Equipment
HDV	Heavy duty vehicle (goods vehicles and buses >3.5t gross vehicle weight)

HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
ICAO	International Civil Aviation Organisation
ICCI	In-combination Climate Change Impacts
LAQM	Local Air Quality Management
LBC	Luton Borough Council
LDV	Light duty vehicle (cars and small vans <3.5t gross vehicle weight)
Luton Rising	A trading name for London Luton Airport Limited, the owners of London Luton Airport
LLAOL	London Luton Airport Operations Limited, the current operators of London Luton Airport
LNR	Local Nature Reserve
LTO	Landing and Take-off
LTP	Local Transport Plans
LWS	Local Wildlife Site
MCATS	Modelling categories
mppa	Million passengers per annum
NAEI	National Atmospheric Emissions Inventory
NH ₃	Ammonia
NHDC	North Hertfordshire District Council
NNR	National Nature Reserves
NO	Nitric oxide
NO _x	Oxides of Nitrogen
NO ₂	Nitrogen Dioxide
NRMM	non-road mobile machinery
O ₃	Ozone
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PM ₁₀	Particulate Matter 10 micrometers or smaller in diameter
PM _{2.5}	Particulate Matter 2.5 micrometers or smaller in diameter
PM ₁	Particulate Matter 1 micrometers or smaller in diameter
pNO ₂	Primary NO ₂
ppb	parts per billion
PSDH	Project for Sustainable Development of Heathrow
SAC	Special Areas of Conservation
SADC	St Albans District Council
SDC	Stevenage District Council
SoS	Secretary of State
SO ₂	Sulphur dioxide
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest
VOC	Volatile Organic Compounds

WebTAG	Web-based Transport Analysis Guidance
WHO	World Health Organization
ZOI	Zone of influence

REFERENCES

- Ref 7.1 The Air Quality Standards Regulations 2010 (SI 2010/1001).
- Ref 7.2 Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management.)
- Ref 7.3 Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air.
- Ref 7.4 Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.
- Ref 7.5 Environment Act 1995, c.25, Part IV.
- Ref 7.6 Environment Act 2021, c.30.
- Ref 7.7 The National Emission Ceilings Regulations 2018, UK Statutory Instrument, 2018 No. 129.
- Ref 7.8 Ministry of Housing, Communities & Local Government. (2021) National Planning Policy Framework. London: The Stationary Office.
- Ref 7.9 Department for Transport (2014) National Policy Statement for National Networks.
- Ref 7.10 Department for Environment Food & Rural Affairs. (2019) The Clean Air Strategy 2019. London: The Stationary Office.
- Ref 7.11 Department for Transport. (2013) Aviation Policy Framework Secretary of State for Transport. London: The Stationary Office.
- Ref 7.12 Department of Transport. (2018) Beyond the horizon, The future of UK aviation, Making best use of existing runways.
- Ref 7.13 HM Government. (2018) Aviation 2050: The future of UK aviation. London: The Stationary Office.
- Ref 7.14 Department for Transport. (2021) Jet Zero Consultation, A consultation on our strategy for net zero aviation. London: The Stationary Office.
- Ref 7.15 Department for Transport. (2021) Decarbonising Transport, A Better, Greener Britain.
- Ref 7.16 Luton Borough Council. (2017) Luton Local Plan 2011-2031
- Ref 7.17 Central Bedfordshire Council. (2021) Central Bedfordshire Local Plan 2015-2035.
- Ref 7.18 North Hertfordshire District Council. (2016) Local Plan 2011-2031, Proposed Submission.
- Ref 7.19 Department for Transport. (2018) Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England.
- Ref 7.20 Department for Environment Food & Rural Affairs. (2021) Local Air Quality Management Technical Guidance (TG16) April 2021.
- Ref 7.21 Holman et al. IAQM Guidance on the assessment of dust from demolition and construction, 2016. Institute of Air Quality Management, London.
- Ref 7.22 Moorcroft and Barrowcliffe. et al. Land-use Planning & Development Control: Planning for Air Quality. v1.2, 2017. Institute of Air Quality Management, London.
- Ref 7.23 Bull et al. IAQM Guidance on the assessment of odour for planning – version 1.1, 2018. Institute of Air Quality Management, London.
- Ref 7.24 International Civil Aviation Organization. Doc 9889 Airport Air Quality Manual. Second Edition, 2020. ICAO, Canada.
- Ref 7.25 Department of Transport. (2017) Air Navigation Guidance 2017.
- Ref 7.26 World Health Organization. (2021) WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization
- Ref 7.27 Defra. Air Quality Management Areas (AQMA). (Online).
- Ref 7.28 Environment Agency (2019) Pollution Inventory (Online).
- Ref 7.29 Natural England. MAGIC (Online).
- Ref 7.30 LLAL (2019) New air quality monitoring from summer 2019.
- Ref 7.31 National Atmospheric Emissions Inventory. UK National Atmospheric Emissions Inventory (NAEI). (Online)
- Ref 7.32 Public Health England. (2019) Review of interventions to improve outdoor air quality and public health. London: PHE publications
- Ref 7.33 Department for Environment Food & Rural Affairs. Emissions Factors Toolkit, 2020. (Online)
- Ref 7.34 Committee on Aviation Environmental Protection (CAEP).
- Ref 7.35 UKCP09 (2010) Technical note: Probabilistic projections of wind speed. UKCP09 additional product.