

Air Quality Assessment: Land East of the Common, Barwell

December 2023



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management & assessment



Document Control

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Job Number	J10/12549B/10
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Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J10/12549B/10/1/F1	11 December 2023	Final	Penny Wilson (Technical Director)

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1 Introduction

- 1.1 This report describes the potential air quality impacts associated with the proposed residential development of land east of The Common, in Barwell (hereafter referred to as the 'Site'). The development will consist of the demolition of all buildings on site and development of up to 95 dwellings, together with associated access, open space and landscaping (hereafter referred to as the 'proposed development').
- 1.2 The proposed development will generate additional traffic on local roads, which may impact on air quality at existing residential properties along the road network which will experience this increase in traffic. The new residential properties will also be subject to the impacts of road traffic emissions from the adjacent road network, in particular the A47. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).
- 1.3 The location and setting of the proposed development are shown in Figure 1.

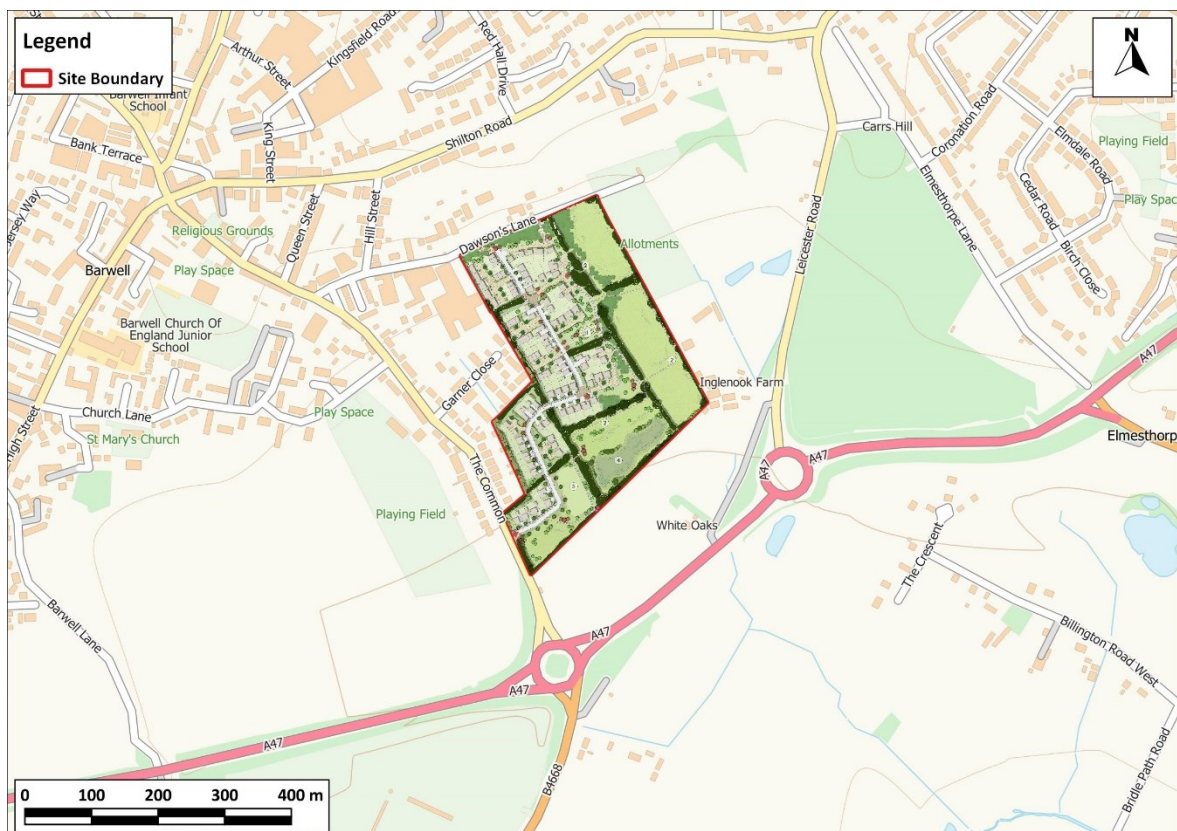


Figure 1: Proposed Development Location

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- 1.4 It is understood at the new homes within the proposed development will be provided with heat and hot water via electrical means, such as heat pumps and solar photovoltaic panels, to avoid the need for onsite combustion.
- 1.5 This report describes existing local air quality conditions (base year 2019; 2020 and 2021 were not used due to the impacts of the Covid-19 pandemic), and considers the air quality conditions in 2025, which is the anticipated year of first occupation (35 units are expected to be delivered in 2025, 35 units in 2026 and 25 units in 2027). It has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Hinckley and Bosworth Borough Council (HBBC).

2 Policy Context

- 2.1 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy 2007

- 2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Air Quality Strategy 2023

- 2.3 The Air Quality Strategy: Framework for Local Authority Delivery 2023 (Defra, 2023a) sets out the strategic air quality framework for local authorities and other Air Quality Partners in England. It sets out their powers and responsibilities, and actions the government expects them to take. It does not replace other air quality guidance documents relevant to local authorities.

Clean Air Strategy 2019

- 2.4 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

- 2.5 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040. It states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero

tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It also states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

- 2.6 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has recently announced that 80% of new cars and 70% of new vans sold in Great Britain must be zero emission by 2030, increasing to 100% by 2035. If these ambitions are realised then road traffic-related NO_x emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Environment Act 2021

- 2.7 The UK's new legal framework for protection of the natural environment, the Environment Act (2021) passed into UK law in November 2021. The Act gives the Government the power to set long-term, legally binding environmental targets. It also establishes an Office for Environmental Protection (OEP), responsible for holding the government to account and ensuring compliance with these targets.
- 2.8 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (SI 2023 No. 96) sets two new targets for future concentrations of PM_{2.5}. These targets are described in Paragraph 3.5.

Environmental Improvement Plan 2023

- 2.9 Defra published its 25 Year Environment Plan in 2018 (Defra, 2018a). The Environment Act (2021) requires Defra to review this Plan at least every five years. The Environmental Improvement Plan 2023 (Defra, 2023b) is the first revision. This outlines the progress made since 2018 and adds detail to the goals defined in the 2018 Plan, including that of achieving clean air.
- 2.10 The Environmental Improvement Plan 2023 sets out the new air quality targets which have been set for concentrations of PM_{2.5}. These targets, which are described in more detail in Paragraph 3.5, include the long-term targets in the Statutory Instrument described in Paragraph 2.8, and interim targets to be achieved by 2028.
- 2.11 The 2023 Plan outlines the role of local authorities in helping it meet both its targets and existing commitments. It also outlines the respective roles of industry, agricultural sectors, and the Department for Transport in providing the coordinated action required to meet both its new, and pre-existing targets and commitments.

Planning Policy

National Policies

- 2.12 The National Planning Policy Framework (NPPF) (2023) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

“to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy”.

- 2.13 To prevent unacceptable risks from air pollution, Paragraph 174 of the NPPF states that:

“Planning policies and decisions should contribute to and enhance the natural and local environment by...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality”.

- 2.14 Paragraph 185 states:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development”.

- 2.15 More specifically on air quality, Paragraph 186 makes clear that:

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan”.

- 2.16 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

“Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified”.

2.17 Regarding plan-making, the PPG states:

“It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality”.

2.18 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan *“identifies measures that will be introduced in pursuit of the objectives and can have implications for planning”.*

2.19 Regarding the need for an air quality assessment, the PPG states that:

“Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity”.

2.20 The PPG sets out the information that may be required in an air quality assessment, making clear that:

“Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific”.

2.21 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

“Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented”.

Local Transport Plan

2.22 The Leicestershire County Council Local Transport Plan 3 for 2011 – 2026 (Leicestershire County Council, 2017), which includes HBBC, includes a focus on air quality. A range of measures are

included within the plan to address air quality issues arising through increased levels of congestion from additional housing in order to support population growth. These include:

“Efforts to reduce congestion and improve performance of our road network... Continued attention to managing the road network, with a view to improving its operational efficiency and reliability, will also make a contribution to reducing congestion and improving air quality”

2.23 and

“Influencing people to make less use of the private car, supporting less polluting car travel and seeking to reduce the need to travel in the first place... will also help us to tackle air quality problems.”

Local Policies

2.24 The Hinckley and Bosworth Local Plan sets out policies to guide development and specific land use proposals. It includes the Core Strategy (HBBC, 2009) and the Site Allocations and Development Management Policies Development Plan Document (DPD) (HBBC, 2016).

2.25 The Core Strategy does not include an objectives pertaining specifically to air quality, however Spatial Objective 10: Climate Change and Resource Efficiency states:

“To minimise the impacts of climate change by promoting the prudent use of resources through sustainable patterns of development, investment in green infrastructure, minimising the use of resources and energy, increasing reuse and recycling of natural resources, increasing the use of renewable energy technologies and minimising pollution, including greenhouse gas emissions.”

2.26 With respect to planning applications, the Site Allocations and Development Management Policies DPD states:

“Applicants will be required to demonstrate that new development should not result in adverse impacts, including cumulative impacts upon air quality. Appropriate construction design and mitigation measures, appropriate distances and screening between developments and sensitive uses will protect the amenity of residents and workers and the environment.”

2.27 Furthermore, Policy DM7 aims to prevent pollution and flooding, and states:

“Adverse impacts from pollution and flooding will be prevented by ensuring that development proposals demonstrate that... it will not contribute to poor air quality”

2.28 Policy DM10 states that developments will be permitted providing that:

“It would not have a significant adverse effect on the privacy and amenity of nearby residents and occupiers of adjacent buildings, including matters of lighting, air quality (and odour), noise, vibration and visual intrusion.”

2.29 The Earl Shilton and Barwell Area Action Plan 2006 – 2026 (Earl Shilton and Barwell Area Action Plan, 2014) also forms part of the HBBC Local Plan. The Action Plan does not contain any policies specifically related to air quality.

2.30 HBBC consulted on its draft Local Plan between 30 June and 27 August 2021 (Hinkley & Bosworth Borough Council, 2021). The draft Plan sets out preferred land allocations and planning policies up to 2039. Once adopted, it will replace the Core Strategy, Site Allocations and Development Management Policies, Hinckley Town Centre Area Action Plan and Earl Shilton and Barwell Area Action Plan.

2.31 The consultation draft Plan contains two policies related to air quality. PMD01 High Quality Design states:

“Development will be supported where the following requirements are met:

... b) The amenity and privacy of nearby residents are not adversely affected, including by matters of lighting, air quality, odour, noise, vibration and visual intrusion”.

2.32 PMD03 Preventing Pollution states:

“Adverse impacts from pollution will be prevented by ensuring that development proposals demonstrate that:

...f) It will not adversely impact air quality”.

Building Standards

2.33 Part F(1) of Schedule 1 of the Building Regulations 2010 as amended June 2022 (Ministry of Housing, Communities & Local Government, 2022) places a duty on building owners, or those responsible for relevant building work¹, to ensure adequate ventilation is provided to building occupants.

2.34 Approved Document F (HM Government, 2021), which accompanies the Building Regulations, explains that care should be taken to minimise entry of external air pollutants. Specific steps should be taken to manage ventilation intakes where the building is near to a significant source of emissions, or if local ambient concentrations exceed values set in the Air Quality Standards Regulations 2010 (see Paragraph 3.1, later). These steps include maximising the distance between emission source and air intake, considering likely dispersion patterns, and considering the timing of pollution releases when designing the ventilation system.

¹ Building work is a legal term for work covered by the Building Regulations. With limited exemptions, the Regulations apply to all significant building work, including erecting or extending a building.

Air Quality Action Plans

National Air Quality Plan

- 2.35 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018b) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ). There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

- 2.36 HBBC declared two AQMAs in May 2001 for exceedances of the annual mean nitrogen dioxide objective. Both AQMAs were revoked in July 2004 and thus no Air Quality Action Plan (AQAP) has since been prepared.
- 2.37 The closest AQMA to the proposed development is the 'Leicester Road Gyratory AQMA' in Nuneaton, approximately 9.5 km southwest of the application site. The AQMA was declared by Nuneaton and Bedworth Borough Council in 2007 for exceedances of the annual mean nitrogen dioxide objective. Nuneaton and Bedworth Borough Council published an AQAP in 2011 (Nuneaton & Bedworth Borough Council, 2011), and sets out how the Council will *"use its existing powers and work together with other organisations in pursuit of the annual mean Air Quality Strategy objective for NO₂ in the AQMAs"*. The council has since prepared a draft Action Plan (Nuneaton and Bedworth Borough Council, 2021), outlining the actions that the council will take to improve air quality in Nuneaton and Bedworth over the next few years until the nitrogen dioxide air quality objective is achieved.
- 2.38 Approximately 11 km northeast of the application site is 'AQMA 3', declared by the adjacent Blaby District Council in 2001 for exceedances of the annual mean nitrogen dioxide objective. The A47 (Hinckley Road) is a one road route connecting Leicester City and Barwell, and it runs through 'AQMA 3'. The AQAP (Blaby District Council, 2021) outlines measures for improvements within this AQMA, including delivery of the Braunstone Crossroads junction improvement, integrating traffic management with air quality monitoring and improving driver information about air quality, e.g. signs and active signs.

3 Assessment Criteria

- 3.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).
- 3.2 The UK-wide objectives for nitrogen dioxide and PM₁₀ were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The PM_{2.5} objective was to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m³ (Defra, 2022). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level.
- 3.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2022). The annual mean objectives for nitrogen dioxide and PM₁₀ are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM₁₀ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.
- 3.4 For PM_{2.5}, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value (see Paragraph 3.10), originally set at 25 µg/m³ and currently set at 20 µg/m³.
- 3.5 Defra has also recently set two new targets, and two new interim targets, for PM_{2.5} concentrations in England. One set of targets focuses on absolute concentrations. The long-term target is to achieve an annual mean PM_{2.5} concentration of 10 µg/m³ by the end of 2040, with the interim target being a value of 12 µg/m³ by the start of 2028². The second set of targets relate to reducing overall population exposure to PM_{2.5}. By the end of 2040, overall population exposure to PM_{2.5} should be

² Meaning that it will be assessed using measurements from 2027. The 2040 target will be assessed using measurements from 2040. National targets are assessed against concentrations expressed to the nearest whole number, for example a concentration of 10.4 µg/m³ would not exceed the 10 µg/m³ target.

reduced by 35% compared with 2018 levels, with the interim target being a reduction of 22% by the start of 2028.

- 3.6 Defra will assess compliance with the population exposure targets by averaging concentrations measured at its own background monitoring stations. This will not consider small changes over time to precisely where people are exposed (such as would relate to exposure introduced by a new development). Furthermore, as explained in Paragraph 2.11, all four new targets provide metrics against which central Government can assess its own progress. While local authorities have an important role delivering the required improvements, these are expected to relate to controlling emissions and not to directly assessing PM_{2.5} concentrations against the targets.
- 3.7 In March 2023, the Department for Levelling Up, Housing and Communities (DLUHC, 2023) explained that the new PM_{2.5} targets will:
- “need to be integrated into the planning system, and in setting out planning guidance for local authorities and businesses, we will consider the specific characteristics of PM_{2.5}. The guidance will be forthcoming in due course, until then we expect local authorities to continue to assess local air quality impacts in accordance with existing guidance.”*
- 3.8 Defra has also provided advice (Defra, 2023c) which explains that there is no current requirement to consider the new PM_{2.5} targets in planning decisions and that guidance to local planning authorities will be forthcoming before this position changes. In the future, when planning decisions do need to consider the new targets, the expectation is that this will focus on reducing emissions from new development rather than there being a direct requirement for planning-related air quality assessments to predict PM_{2.5} concentrations.
- 3.9 For the time being, therefore, no assessment is required, and indeed no robust assessment is possible, in relation to the new PM_{2.5} targets and they are not considered further.
- 3.10 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM₁₀ and PM_{2.5}, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).
- 3.11 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM₁₀ and PM_{2.5}

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
PM ₁₀	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³
PM _{2.5} ^a	Annual Mean	20 µg/m ³

^a The PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Screening Criteria

- 3.12 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)³ recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m² of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.
- 3.13 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A1) inside an AQMA are a change in flows of more than 25 heavy duty vehicles (HDV) or 100 light duty vehicles (LDV) per day; outside of an AQMA the thresholds are 100 HDVs or 500 LDVs. Where these criteria are exceeded, a detailed assessment is likely to be required, although the guidance advises that *“the criteria provided are precautionary and should be treated as indicative”*, and *“it may be appropriate to amend them on the basis of professional judgement”*.

³ The IAQM is the professional body for air quality practitioners in the UK.

4 Assessment Approach

Consultation

4.1 The assessment follows a methodology discussed with HBBC via a telephone discussion and email correspondence with Giles Rawdon (Environmental Health Officer at HBBC) and Dr Kate Wilkins (Air Quality Consultants) on 26 August 2021. Specifically, the following key points were discussed:

- while traffic generated by the proposed development is expected to exceed the EPUK/IAQM screening criteria of 500 Annual Average Daily Traffic (AADT) movements recommended for outside an AQMA, this will only occur along The Common between the site access and the A47, where there are no existing residential properties. Furthermore, once this additional traffic reaches the A47 it distributes onto road network such that the traffic increase will be below the criteria adjacent to any relevant existing receptors. Thus, a qualitative assessment of the impacts of emissions from the traffic generated by the development will be undertaken; and
- the new homes being located well away from any significant air pollution sources, thus a qualitative assessment of the air quality conditions for future residents will be undertaken.

Existing Conditions

4.2 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2023d);
- local sources have been identified through examination of the Council's Air Quality Review and Assessment reports;
- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority;
- background concentrations have been defined using Defra's 2018-based background maps (Defra, 2023e). These cover the whole of the UK on a 1x1 km grid. The background annual mean nitrogen dioxide maps for 2019 have been calibrated against concurrent measurements from national monitoring sites (AQC, 2020). Future year backgrounds have not been adjusted (AQC, 2023). Mapped background concentrations of PM₁₀ and PM_{2.5} have also not been adjusted; and
- whether or not there are any exceedances of the annual mean limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020; 2023f). These are the maps used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN)

monitoring sites that operate to the required data quality standards, to identify and report exceedances of the limit value. The national maps of roadside PM₁₀ and PM_{2.5} concentrations (Defra, 2023g), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Impacts of Road Traffic on Existing Receptors

- 4.3 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.12 and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Impacts of Road Traffic on Future Residents of the Proposed Development

- 4.4 The impacts of nitrogen dioxide, PM₁₀ and PM_{2.5} concentrations on new residents of the development have been assessed qualitatively, taking account of local air quality monitoring data and proximity to local roads.
- 4.5 The assessment examines air quality conditions in 2019 and assumes these are representative of air quality conditions at the time the development is occupied; this assumption is considered to be worst-case as it is generally expected that nitrogen dioxide, PM₁₀ and PM_{2.5} concentrations will decline in future years.

Assessment of Significance

- 4.6 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A2. Full details of the EPUK/IAQM approach are provided in Appendix A1.

5 Baseline Conditions

Relevant Features

- 5.1 The proposed development is located in Barwell, approximately 3.5 km to the northeast of Hinckley. The application site is bounded by Dawson's Lane to the north, residential properties, light industrial units and The Common to the west, agricultural land and the A47 to the south, and allotments and Inglenook Farm antiques and salvage yard to the east. It currently consists of agricultural land.

Industrial sources

- 5.2 The Barwell Recycling and Household Waste Centre is located approximately 1.1 km to the northwest of the proposed development. Based on this distance and the location of the facility in relation to the prevailing wind direction in the UK (south-westerly), it is considered that the facility will not significantly affect the proposed development in terms of air quality and/or odour.
- 5.3 No other significant industrial or waste management sources have been identified that are likely to affect the proposed development, in terms of air quality and/or odour.

Local Air Quality Monitoring

- 5.4 HBBC does not operate any automatic monitoring stations within its area, but does operate a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by SOCOTEC Didcot (using the 50% TEA in acetone method). These include two located within 2 km of the proposed development in Earl Shilton; one adjacent to Wood Street and one adjacent to the Bypass. Annual mean results for the years 2015 to 2020 are summarised in Table 2. The monitoring locations are shown in Figure 2. The monitoring data have been taken from HBBC's 2020 and 2021 Annual Status Reports (Hinckley & Bosworth Borough Council, 2020; 2021).

Table 2: Summary of Annual Mean NO₂ Monitoring (2015-2020) (µg/m³)

Site No.	Site Type	Location	2015	2016	2017	2018	2019	2020
8	Suburban	Earl Shilton Bypass	17.4	17.9	17.7	16.2	19.1	15.6
9	Urban Centre	Wood Street Earl Shilton	22.8	23.9	21.7	20.9	23.3	18.8
Objective			40					

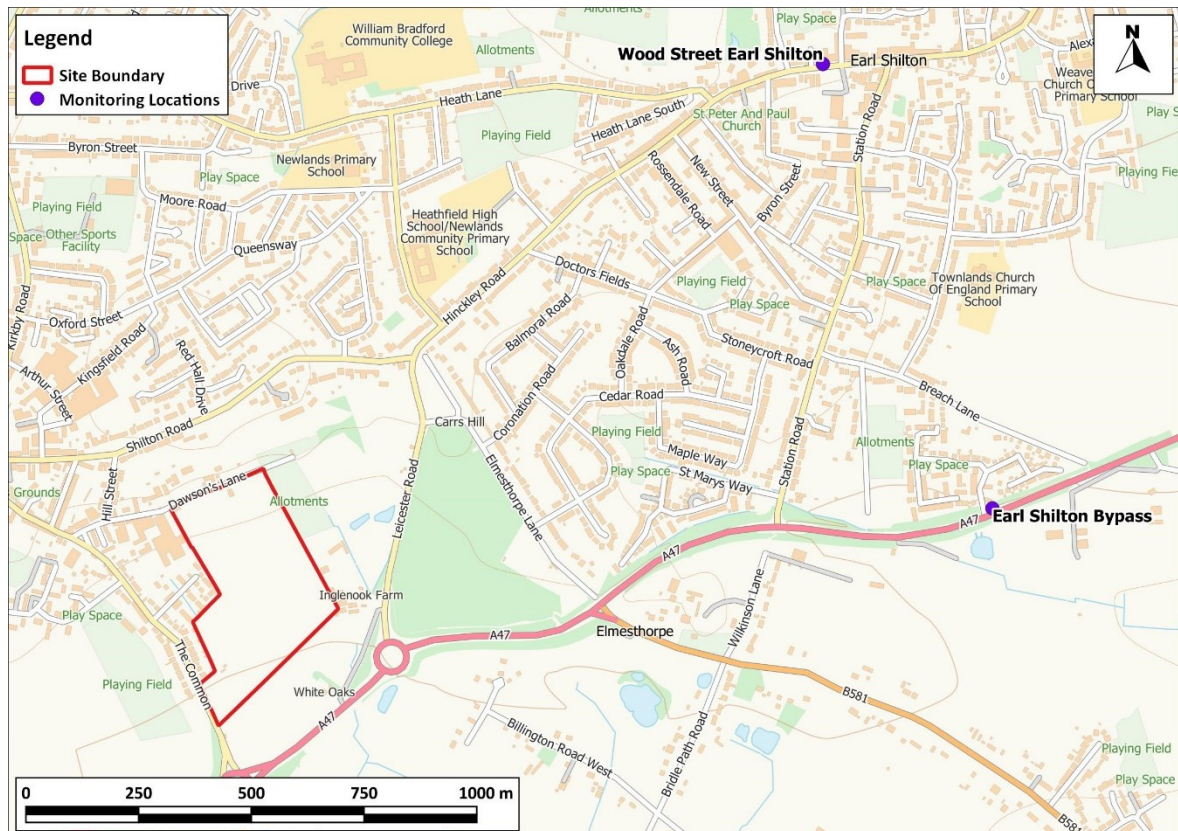


Figure 2: Monitoring Locations

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- 5.5 As shown in Table 2, annual mean nitrogen dioxide concentrations measured within Earl Shilton have been below the objective for all years between 2015 and 2020. There is no clear trend in the measured concentrations during that time. While 2020 results have been presented in this Section for completeness, they are not relied upon in any way as they will not be representative of 'typical' air quality conditions due to the considerable impact of the Covid-19 pandemic on traffic volumes and thus pollutant concentrations.
- 5.6 The areas that will be developed for residential use within the proposed development will be set well back from any main roads, thus concentrations at residential properties within the proposed development are expected to be lower than those measured at both monitors shown in Table 2, which are located 6 m from the kerb of the busy A47, and 1 m from the kerb of Wood Street, respectively.
- 5.7 No monitoring of PM₁₀ or PM_{2.5} concentrations is undertaken by HBBC.

Exceedances of Limit Value

- 5.8 There are no AURN (Defra, 2023f) monitoring sites within 1 km of the application site with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2023g), which are used to identify and report exceedances of the limit value, do not identify any exceedances within 1 km of the application site in 2019. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

Background Concentrations

- 5.9 Estimated background concentrations in the study area for the baseline year (2019) and the opening year (2025) are set out in Table 3 and are all well below the objectives. A range of values is presented as the study area covers multiple 1x1 km grid squares.

Table 3: Estimated Annual Mean Background Pollutant Concentrations in 2019 and 2025 ($\mu\text{g}/\text{m}^3$)

Year	NO ₂	PM ₁₀	PM _{2.5}
2019	11.7 – 12.2	13.4 – 14.0	8.8 – 8.9
2025	8.6 - 9.1	12.4 – 13.1	8.0 – 8.1
Objective	40	40	20 ^a

^a The PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

6 Impact Assessment

Impacts at Existing Receptors

- 6.1 The project transport consultants (Stantec), have advised that the proposed development is expected to exceed the screening criteria as detailed in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (as 500 LDVs AADT recommended for use outside of an AQMA as detailed in see Paragraph 3.13) on The Common, between the site access and the A47 (654 AADT, of which two are HGVs). Beyond the roundabout on the A47, the traffic is expected to disperse, and traffic flows will be lower than the screening criteria throughout the road network, including within Blaby District's AQMA 3 and Nuneaton and Bosworth District's Leicester Road Gyratory AQMA (where the screening criteria is more stringent as a change greater than 100 LDV AADT).
- 6.2 While the screening threshold for outside an AQMA is exceeded on a section of The Common, there are no existing sensitive receptors along that stretch of road. The closest residential property to the proposed access road will be approximately 25 m away from the access, and is set back from the kerb of The Common by approximately 13 m. Considering that the measured annual mean nitrogen dioxide concentrations in the local area shown in Table 2 are well below the objective (i.e., 23.3 $\mu\text{g}/\text{m}^3$ at Site 9 in 2019), it is judged that the emissions from increased traffic due to the proposed development will have a negligible impact on air quality at existing receptors along the local road network. It is therefore considered that there is no requirement for a detailed assessment of road traffic impacts, and it can be concluded that the proposed development will not have a significant impact on local roadside air quality.

Impacts of Existing Sources on Future Residents of the Development

- 6.3 The majority of the area within the application site that will be developed for residential use is located well away from any busy roads (see Figure 1), in an area where pollutant concentrations would be expected to be close to background levels. Background concentrations at the site are well below the objectives (see Table 3). The closest residential property within the application site to The Common will be set back by approximately 12 m from the kerb. Annual mean nitrogen dioxide concentrations close to Shilton Bypass (6 m from the kerb of the road) and Wood Street, Earl Shilton (1 m from the kerb of the road) are well below the objective, and it is therefore considered unlikely that there will be any exceedances of the objectives at the locations of residential properties close to The Common. Thus, it can be concluded that future residents will experience acceptable air quality, and there is no need for more detailed assessment.

Significance of Operational Air Quality Effects

- 6.4 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A1, and takes account of the assessment that:

- pollutant concentrations at worst-case locations within the proposed development will all be below the objectives, thus future residents will experience acceptable air quality; and
- additional traffic generated by the proposed development is anticipated to have a negligible impact on local air quality.

7 Mitigation

Good Design and Best Practice

- 7.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The development framework of the proposed development has been designed such that the residential properties are located well away from the nearest main roads.
- 7.2 The EPUK/IAQM guidance predates the recent publication by Defra of long-term air quality targets for PM_{2.5}. As explained in Paragraph 3.5, meeting the new target will require positive action from many different sectors. While it is not appropriate to determine individual planning applications based on whether future PM_{2.5} concentrations in an area will be above or below the concentration target, it is nevertheless appropriate that new development contributes to meeting the national targets by ensuring that air quality is taken into account in development design.

Recommended Mitigation

- 7.3 The assessment has demonstrated that the overall air quality effect of the proposed development will be 'not significant'; it will not introduce any new exposure into areas of unacceptable air quality, nor will the development-generated traffic emissions have a significant impact on local air quality. It is, therefore, not considered appropriate to propose further mitigation measures for this development.
- 7.4 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law).

8 Conclusions

- 8.1 The assessment has considered the impacts of the proposed development on local air quality in terms of emissions from road traffic generated by the completed and occupied development.
- 8.2 The assessment has screened out any adverse air quality impacts associated with the proposed development and demonstrated therefore that emissions from the additional traffic generated by the proposed development will have a *negligible* impact on air quality conditions at all existing receptors along the local road network.
- 8.3 Air quality conditions for future residents of the proposed development are considered to be acceptable, with concentrations expected to be well below the air quality objectives throughout the site.
- 8.4 The overall operational air quality effects of the proposed development are judged to be 'not significant'.
- 8.5 Taking into account these conclusions, it is judged that the proposed development is consistent with Paragraph 185 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents. It is also consistent with Paragraph 186, as it will not affect compliance with relevant limit values or national objectives. The proposed development is also consistent with Policies DM7 and DM10 of HBBC's Development Management Policies DPD (and Policies PMD01 and PMD03 of the draft Local Plan), in that it will not contribute to poor air quality, nor will it have a significant adverse effect on nearby residents and occupiers of adjacent buildings, in terms of air quality.

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10 Glossary

AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
EU	European Union
EV	Electric Vehicle
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
kW	Kilowatt
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
µg/m³	Microgrammes per cubic metre
NO	Nitric oxide
NO₂	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO ₂ + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the

standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides

OLEV	Office for Low Emission Vehicles
PM₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
PM_{2.5}	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide

11 Appendices

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A1 EPUK & IAQM Planning for Air Quality Guidance

- A1.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

“Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations”.*

Recommended Best Practice

- A1.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

“The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions”.

- A1.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m² of commercial floorspace;
- are carried out on land of 1 ha or more.

- A1.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new “street canyon”, as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) “rapid charge” point per 10 residential dwellings and/or 1000 m² of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNO_x/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
 - Spark ignition engine: 250 mgNO_x/Nm³;
 - Compression ignition engine: 400 mgNO_x/Nm³;
 - Gas turbine: 50 mgNO_x/Nm³.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNO_x/Nm³ and 25 mgPM/Nm³.

A1.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

“It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the “damage cost approach” used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential”.

A1.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

“There may be a requirement to carry out an air quality assessment for the impacts of the local area’s emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development”.*

Impacts of the Development on the Local Area

A1.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m² of floor space for all other uses or a site area greater than 1 ha.

A1.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A1.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A1.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A1.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

“Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable”.

- A1.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

“The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive ‘trigger’ for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality”.

- A1.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

“The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer”.

- A1.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

- A1.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

- A1.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either ‘significant’ or ‘not significant’. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A1.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A1.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A2.

A2 Professional Experience

Penny Wilson, BSc (Hons) CSci MEnvSc MIAQM

Ms Wilson is a Technical Director with AQC, with more than 20 years' relevant experience in the field of air quality. She has been responsible for numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including dust and odour nuisance. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning and DCO applications. She has provided expert evidence to a number of Public Inquiries and civil court, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

Suzanne Hodgson, BSc (Hons) MSc CSci MEnvSc MIAQM

Ms Hodgson is a Principal Consultant with AQC, with more than 16 years' experience in the field of air quality management and assessment. She has been responsible for a wide range of air quality projects covering impact assessments for new residential, commercial and industrial developments, EIA development, local air quality management, ambient air quality monitoring of various pollutants, including data ratification, and the assessment of nuisance odours and construction dust. She has extensive modelling experience, including the modelling of road traffic, energy centres (including energy from waste) and odour sources, and is familiar with preparing stand-alone air quality reports as well as chapters for inclusion within an Environment Statement. Suzanne has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers and process operators. She is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Dr Kate Wilkins, BSc (Hons) MSc PhD CSci MEnvSc MIAQM

Dr Wilkins is a Principal Consultant with AQC with over five years' experience in the field of air quality. Since joining AQC in January 2018, she has undertaken numerous air quality impact assessments for road traffic, combustion plant and construction dust throughout the UK for both standalone assessments and for EIAs, and has also prepared local authority reports and literature reviews. She has contributed her technical skills in programming, specialist software and data analysis to a range of large-scale projects, including the third runway at Heathrow airport. Previously, Kate completed a PhD at the University of Bristol, researching atmospheric dispersion modelling and satellite remote sensing of volcanic ash. She is a Chartered Scientist and a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.