Air Quality Neutral Assessment:

Land Rear of 25 – 31, Warren Road, Hillingdon

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Experts in air quality management & assessment

Document Control

Client	W J Macleod Architects	**Principal Contact**	Bill Macleod

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Report Prepared By:	Wale Abiye

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Air Quality Consultants Ltd
23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086
24 Greville Street, Farringdon, London, EC1N 8SS Tel: 020 3873 4780
aqc@aqconsultants.co.uk

Registered Office: 23 Coldharbour Road, Bristol BS6 7JT
Companies House Registration No: 2814570

Executive Summary

The air quality neutrality of the proposed development on land rear of 25 – 31, Warren Road in London Borough of Hillingdon has been assessed. The proposed development is described as *"the erection of 4 units of two storey, detached houses, with habitable accommodation in roof space, garage and associated landscaping, parking and installation of vehicular crossover".*

The proposed development is a minor development, the dwellings will be provided with heat through air source heat pumps (ASHP) and the parking provision meets the maximum parking standard of the London Plan. As such the proposed development is not associated with any building or transport related emissions. Thus, the proposed development has been shown to meet the London Plan's requirement that new developments are at least 'air quality neutral'

The assessment has also demonstrated that future residents will experience acceptable air quality, with pollutant concentrations below the air quality objectives.

Overall, the air quality effects of the proposed development are judged to be 'not significant'.

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1 Introduction

1.1 This describes the Air Quality Neutral (AQN) assessment of the proposed development of four residential properties on Land Rear of 25 – 31 Warren Road, Hillingdon. The proposed development is described as:

"the erection of 4 units of two storey, detached houses, with habitable accommodation in roof space, garage and associated landscaping, parking and installation of vehicular crossover"

1.2 The Greater London Authority's (GLA's) London Plan (GLA, 2021) requires new developments to be air quality neutral. The air quality neutrality of the proposed development has been assessed following the methodology provided in the GLA's latest London Plan Guidance (Air Quality Neutral) (GLA, 2023)

1.3 The proposed development lies within an Air Quality Management Area (AQMA) declared by the London Borough (LB) of Hillingdon for exceedances of the annual mean nitrogen dioxide (NO_2) objective. It is also located adjacent to one of the GLA's air quality Focus Areas, A40 / Swakeleys Road; these are locations with high levels of human exposure where the annual mean limit value for nitrogen dioxide is exceeded.

1.4 The proposed development will be provided with heating via air source heat pumps (ASHP) and the car parking provision meets the GLA maximum car parking standard.

1.5 The location and setting of the proposed development is shown in Figure 1.

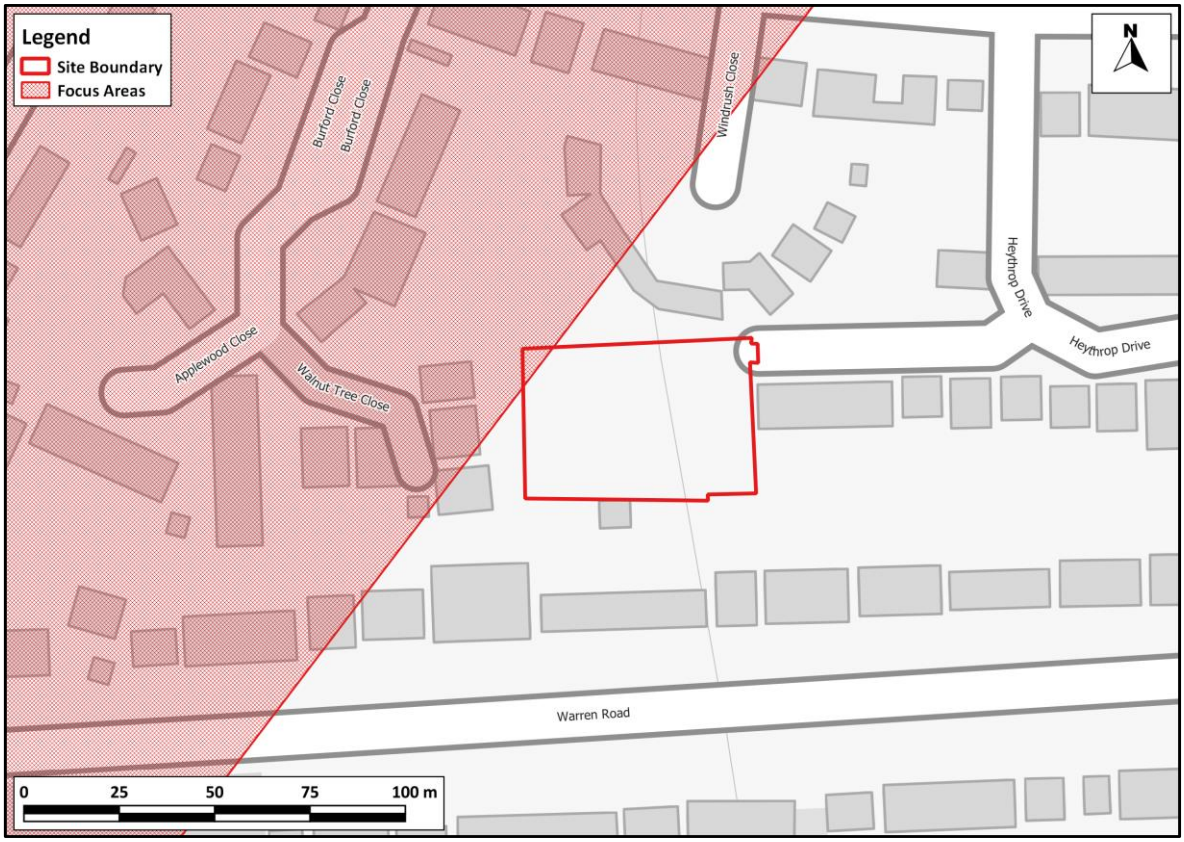

Figure 1: Proposed Development Setting

1.6 This report has been prepared taking into account all relevant local and national guidance and regulations.

2 Policy Context

2.1 The key London-specific policies are summarised below, with more detail provided, where required, in Appendix A1.

The London Plan

2.2 The London Plan (GLA, 2021) sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The key policy relating to air quality is Policy SI 1 on *Improving air quality*, Part B1 of which sets out three key requirements for developments:

"Development proposals should not:

a) lead to further deterioration of existing poor air quality

b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c) create unacceptable risk of high levels of exposure to poor air quality".

2.3 The Policy then details how developments should meet these requirements, stating:

"In order to meet the requirements in Part 1, as a minimum:

a) development proposals must be at least Air Quality Neutral

b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures

c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1

d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure".

2.4 Part C of the Policy introduces the concept of Air Quality Positive for large-scale development, stating:

"Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

1) *how proposals have considered ways to maximise benefits to local air quality, and*

2) *what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this."*

2.5 The proposed development is not large-scale development, thus an Air Quality Positive statement is not required.

2.6 Regarding construction and demolition impacts, Part D of Policy SI 1 of the London Plan states:

"In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance".

2.7 Part E of Policy SI 1 states the following regarding mitigation and offsetting of emissions:

"Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development".

2.8 The explanatory text around Policy SI 1 of the London Plan states the following with regard to assessment criteria:

"The Mayor is committed to making air quality in London the best of any major world city, which means not only achieving compliance with legal limits for Nitrogen Dioxide as soon as possible and maintaining compliance where it is already achieved, but also achieving World Health Organisation targets for other pollutants such as Particulate Matter.

The aim of this policy is to ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality. This means that new developments, as a minimum, must not cause new exceedances of legal air quality standards, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits. Where limit values are already met, or are predicted to be met at the time of completion, new developments must endeavour to maintain the best ambient air quality compatible with sustainable development principles.

Where this policy refers to 'existing poor air quality' this should be taken to include areas where legal limits for any pollutant, or World Health Organisation targets for Particulate Matter, are already exceeded and areas where current pollution levels are within 5 per cent of these limits"[1].

2.9 The London Plan includes a number of other relevant policies, which are detailed in Appendix A1.

London Environment Strategy

2.10 The London Environment Strategy was published in May 2018 (GLA, 2018a). The strategy considers air quality in Chapter 4; the Mayor's main objective is to create a *"zero emission London by 2050".* Policy 4.2.1 aims to *"reduce emissions from London's road transport network by phasing out fossil fuelled vehicles, prioritising action on diesel, and enabling Londoners to switch to more sustainable forms of transport".* The strategy sets a target to achieve, by 2030, the guideline value for $PM_{2.5}$ which was set by the World Health Organisation (WHO) in 2005. An implementation plan for the strategy has also been published which sets out what the Mayor will do between 2018 and 2023 to help achieve the ambitions in the strategy.

Air Quality Focus Areas

2.11 The GLA has identified 160 air quality Focus Areas in London. These are locations that not only exceed the annual mean limit value for nitrogen dioxide, but also have high levels of human exposure. They do not represent an exhaustive list of London's air quality hotspot locations, but locations where the GLA believes the problem to be most acute. They are also areas where the GLA considers there to be the most potential for air quality improvements and are, therefore, where the GLA and Transport for London (TfL) will focus actions to improve air quality. The proposed development is located close to an air quality Focus Areas.

Local Policies

2.12 The London Borough of Hillingdon Local Plan is made up of two parts. Part 1 on Strategic Policies was adopted in 2012 (LB of Hillingdon, 2012) and Part 2 on Development Management Policies was adopted in 2020 (LB of Hillingdon, 2020). Policy DMEI 14 of the Local Plan Part 2 on Air Quality states that:

A. *Development proposals should demonstrate appropriate reductions in emissions to sustain compliance with and contribute towards meeting EU limit values and national air quality objectives for pollutants.*

B. *Development proposals should, as a minimum:*

   i. *be at least "air quality neutral";*

[1] The London Plan was developed based on a World Health Organisation guideline for $PM_{2.5}$ of 10 $\mu g/m^3$ (see Paragraph 2.10).

ii. include sufficient mitigation to ensure there is no unacceptable risk from air pollution to sensitive receptors, both existing and new; and

iii. actively contribute towards the improvement of air quality, especially within the Air Quality Management Area.

2.13 Also, Policy DMT 6: Vehicle Parking of the Local Plan Part 2 states;

A. Development proposals must comply with the parking standards outlined in Appendix C Table 1 in order to facilitate sustainable development and address issues relating to congestion and amenity. The Council may agree to vary these requirements when:

i. the variance would not lead to a deleterious impact on street parking provision, congestion or local amenity; and/or

ii. a transport appraisal and travel plan has been approved and parking provision is in accordance with its recommendations.

B. All car parks provided for new development will be required to contain conveniently located reserved spaces for wheelchair users and those with restricted mobility in accordance with the Council's Accessible Hillingdon SPD."

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 PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter.

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. The GLA explains where these objectives will apply in London (GLA, 2019). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals and care homes etc., the gardens of residential properties, school playgrounds and the grounds of hospitals and care homes. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as 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 3.9), originally set at 25 $\mu g/m^3$ and currently set at 20 $\mu g/m^3$.

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 $\mu g/m^3$ by the end of 2040, with the interim target being a value of 12 $\mu g/m^3$ by the start of 2028[2]. 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 reduced by 35% compared with 2018 levels, with the interim target being a reduction of 22% by the start of 2028.

[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 $\mu g/m^3$ would not exceed the 10 $\mu g/m^3$ target.

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 3.5, 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, the actions required of local authorities, which will be clarified within a future Air Quality Strategy, relate to controlling emissions and not to directly assessing $PM_{2.5}$ concentrations against the targets.

3.7 Development control decisions can most effectively support Defra to achieve all four targets by optimising new developments to reduce their total emissions. The ambient concentrations to which occupants of new developments are exposed will have no effect on the ability to meet these targets. Similarly, where a new development causes an increase in local concentrations, this must be viewed in the context that all four targets relate to concentrations across England as a whole; there will be very few locations where a localised impact could alter the date by which the target is achieved in England.

3.8 As explained in Paragraph 2.10, the GLA has set a target to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m^3 by 2030. This target was derived from an air quality guideline set by WHO in 2005. In 2021, WHO updated its guidelines, but the London Environment Strategy (GLA, 2018a) considers the 2005 guideline of 10 µg/m^3. While there is no explicit requirement to assess against the GLA target of 10 µg/m^3, it has nevertheless been included within this assessment.

3.9 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010)[3]. The limit values for nitrogen dioxide, PM_{10} are the same numerical concentrations as the UK objectives, but achievement of the limit values is a national obligation rather than a local one and concentrations are reported to the nearest whole number. 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).

3.10 The relevant air quality criteria for this assessment are provided in Table 1.

[3] As amended through The Air Quality Standards (Amendment) Regulations 2016 and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Value
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 [a]
$PM_{2.5}$	Annual Mean	20 µg/m^3 [b]
	Annual Mean	10 µg/m^3 by 2030
	Annual Mean	12 µg/m^3 before 2028 [c]
	Annual Mean	10 µg/m^3 by 2040 [c]

[a] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2022e).

[b] There is no numerical $PM_{2.5}$ objective for local authorities (see Paragraph 3.4). Convention is to assess against the UK limit value which is currently 20 µg/m^3.

[c] Expressed to the nearest whole number. Defra has explained in the 2023 Environmental Improvement Plan (Defra, 2023) that local authority responsibilities in relation to these targets relate to controlling emissions and not determining concentrations.

4 Assessment Approach

Existing Conditions

4.1 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, 2022a);
- 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 2019-based background maps (Defra, 2022d) These cover the whole of the UK on a 1x1 km grid. The background annual mean nitrogen oxides and nitrogen dioxide maps for 2019 have been calibrated against concurrent measurements from Inner London monitoring sites (AQC, 2020a). The calibration factor calculated has also been applied to future year backgrounds. Mapped background concentrations of PM_{10} and $PM_{2.5}$ have 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) (2022b). 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 PM_{10} and $PM_{2.5}$ concentrations (Defra, 2022b), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

'Air Quality Neutral'

4.2 The GLA's London Plan Guidance (Air Quality Neutral) (GLA, 2023)sets out guidance on how an 'air quality neutral' assessment should be undertaken. It also provides a methodology for calculating an offsetting payment if a development is not 'air quality neutral' and it is not possible to identify or agree appropriate and adequate mitigation. The document is currently in consultation draft.

4.3 The consultation draft guidance provides a simplified assessment approach for minor developments, which has been followed in this report.

5 Baseline Conditions

Industrial Sources

5.1 No significant industrial or waste management sources have been identified that are likely to affect the proposed development, in terms of air quality.

Local Air Quality Monitoring

5.2 London Borough of Hillingdon operates eleven automatic monitoring stations within its area, however, none of these are near the proposed development. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Gradko International (using the 50% TEA in acetone method). These include one deployed in Warren Road Ickenham, one in The Drive, and one in Harefield Road, Uxbridge. Annual mean results for the years 2015 to 2021 are summarised in Table 2.

Table 2: Summary of Annual Mean NO_2 Monitoring (2015-2021) (µg/m^3)

Site No.	Site Type	Location	2015	2016	2017	2018	2019	2020	2021
HILL06	Roadside	Warren Road Ickenham	**42.3**	39.0	**45.6**	37.6	35.0	30.9	29.7
HILL23	Roadside	198 Harefield Road, Uxbridge Lamp Post (2)	34.0	34.8	34.2	35.1	29.3	22.1	23.8
HILL42	Roadside	Field on South corner of The Drive. UB10 8DA	-	-	-	-	39.6	28.9	29.3
Objective				**40**					

[a] Exceedances of the objectives are shown in bold.

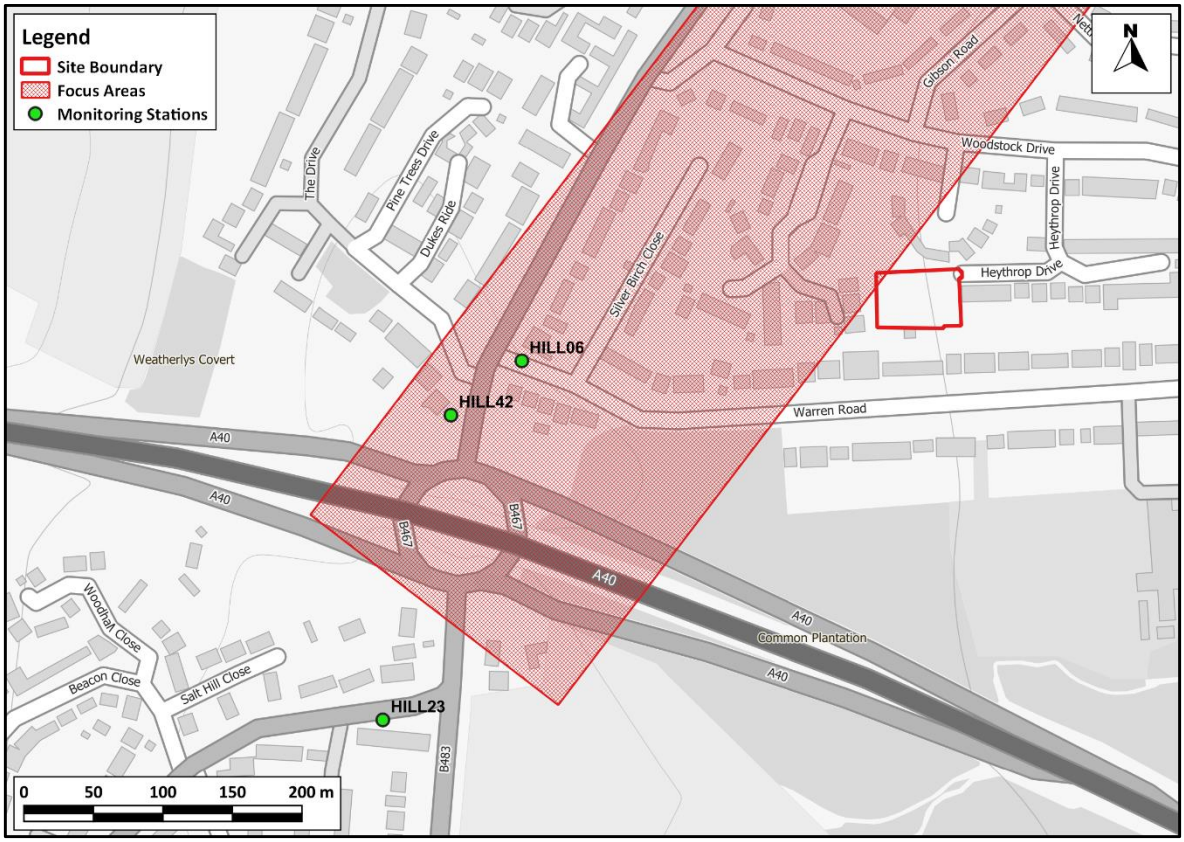

Figure 2: The Proposed Development Setting in the Context of Air Quality

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5.3 There have been no exceedances of NO_2 annual mean concentration at HILL23 and HILL42 monitoring station since 2015 (or since monitoring started in the case of HILL42).

5.4 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.

5.5 Notwithstanding the above, NO_2 annual mean concentration have been decreasing at HILL06 monitoring station since 2017 and below the objective since 2018.

5.6 There was no exceedance of the NO_2 annual concentration at the three monitoring stations in 2019. Due to the effect of COVID-19 on traffic flow and air quality, London Borough of Hillingdon require that 2019 data should be used by developers to characterise baseline conditions (LB of Hiilingdon, 2022).

Background Concentrations

5.7 Estimated background concentrations at the proposed development are set out in Table 3 and are all well below the objectives.

Table 3: Estimated Annual Mean Background Pollutant Concentrations in 2019 and 2025 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2019	24.8	17.0	11.4
2025	18.4	15.7	10.4
Objective / GLA target	**40**	**40**	**20/10** [a]

[a] The 20 µg/m^3 $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it. 10 µg/m^3 is the GLA target for annual mean $PM_{2.5}$; again, there is no requirement for local authorities to meet this.

6 Impact Assessment

6.1 As discussed in paragraph 5.1, there are no significant industrial or waste management sources that are likely to affect the proposed development in terms of air quality. Future residents of the proposed development will therefore experience acceptable air quality as concentrations of pollutants are below the relevant objectives and no exceedances of limit values have been identified within 1 km of the site.

7 'Air Quality Neutral'

7.1 The purpose of the London Plan's requirement that development proposals be 'air quality neutral' is to prevent the gradual deterioration of air quality throughout Greater London. The 'air quality neutrality' of a proposed development, as assessed in this section, does not directly indicate the potential of the proposed development to have significant impacts on human health. The air quality assessment has been undertaken using the GLA's latest London Plan Guidance (Air Quality Neutral) (GLA, 2023) .

7.2 According to the GLA, residential development where 1- 9 dwellings are to be provided, or the site area is less 0.5 hectares are classed as *"minor development".* The proposed development will deliver 4 units of new residential dwellings. Based on the GLA definition, the proposed development is a *"minor development".*

Building Emissions

7.3 In terms of building emissions, Paragraph 3.1.1 of the guidance states:

"*Where minor developments include new heating systems, they can be assumed to meet the BEB [Building Emission Benchmark] if:*

- *the new heating system is a heat pump or other zero emission heat source;*
- *the new heating system is a gas boiler with NOx emissions rated at less than 40 mg/kWh; or*
- *the development is connecting to an existing heat network."*

Also, Paragraph 3.1.4 states:

"most non-combustion heat sources such as electric panel heaters and heat pumps (including air source and ground source heat pumps) are assumed to have zero heat-related NOx emissions".

The proposed development does not include any combustion plant for the routine provision of electricity, heating or hot water and will thus have no direct building emissions. It will provide heat through air source heat pump (ASHP). The proposed development is, therefore, better than air quality neutral in terms of building emissions.

Road Transport Emissions

7.4 In term of road transport emissions, Paragraph 4.1.1 of the guidance states:

"Where minor developments include new parking, they can be assumed to meet the TEB [Transport Emission Benchmark] if the maximum parking standards set out in policies T6 and T6.1 to T6.5 of the London Plan are not exceeded."

The specific maximum parking standard relevant to this assessment requires that development in Outer London where the Public Transport Accessibility Level (PTAL) is 0 to 1 may provide up to 1.5 spaces per dwelling. However, the standard offers some flexibility for town centres and for outer London boroughs to consider appropriate balance where it is deemed fit.

7.5 Based on the above, the London Borough of Hillingdon have set a maximum parking standard of two car parking spaces per dwelling in line with the London Plan Guidance (LB of Hillingdon, 2020).

7.6 The proposed development is located on Warren Road in the London Borough of Hillingdon (an area with PTAL of 1b) and makes provision for two car parking spaces per dwelling. The proposed development therefore does not exceed the maximum parking standard. Thus, the proposed development is air quality neutral in term transport emissions.

Summary

7.7 The building and transport related emissions associated with the proposed development are both below the relevant benchmarks. The proposed development therefore complies with the requirement that all new developments in London should be at least air quality neutral.

8 Mitigation

Good Design and Best Practice

8.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required.

8.2 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.

8.3 The proposed development incorporates the following good design and best practice measures, which have been accounted for in the assessment as far as is possible:

- setting back of the development buildings from roads by at least 50 m;
- provision of 1 active and 1 passive electric vehicle charging point for each dwelling; and
- the provision of heating via air source heat pump.

Recommended Mitigation

8.4 The assessment has demonstrated that the overall air quality effect of the proposed development will be 'not significant'. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

8.5 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). The local air quality action plan that LB of Hillingdon to address limit value exceedances in its area will also help to improve air quality.

9 Conclusions

9.1 The assessment has considered the air quality conditions within the proposed development by the time it is operational. It has also assessed whether or the proposed development is air quality neutral as required by the London Plan.

9.2 The overall operational air quality effects of the proposed development are judged to be 'not significant'.

Air Quality Neutral

9.3 The building and transport related emissions associated with the proposed development are both below the relevant benchmarks. The proposed development therefore complies with the requirement that all new developments in London should be at least air quality neutral.

Policy Implications

9.4 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 Policy DMEI 14 of LB of Hillingdon Local Plan, as it will not have a significant detrimental effect on air quality and it is air quality neutral. The proposed development is compliant with Policy T6 Car Parking of the London Plan in the following ways:

- it will provide electric charging infrastructure; and
- it is better than air quality neutral

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11 Appendices

A1 London-Specific Policies and Measures

London Plan

Design-led Approach

A1.1 Policy D3 on optimising site capacity through the design-led approach states that *"development proposals should…help prevent or mitigate the impacts of noise and poor air quality"*. The explanatory text around this Policy states the following:

"Measures to design out exposure to poor air quality and noise from both external and internal sources should be integral to development proposals and be considered early in the design process. Characteristics that increase pollutant or noise levels, such as poorly-located emission sources, street canyons and noise sources should also be designed out wherever possible. Optimising site layout and building design can also reduce the risk of overheating as well as minimising carbon emissions by reducing energy demand".

Development Plans

A1.2 Policy SI 1 of the London Plan (GLA, 2021) states the following regarding strategic development plans:

Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

Preliminary Air Quality Assessment

A1.3 The London Plan sets out expectations around the consideration of air quality in the design of all major developments:

"For major developments, a preliminary Air Quality Assessment should be carried out before designing the development to inform the design process. The aim of a preliminary assessment is to assess:

- *The most significant sources of pollution in the area*
- *Constraints imposed on the site by poor air quality*
- *Appropriate land uses for the site*
- *Appropriate design measures that could be implemented to ensure that development reduces exposure and improves air quality.*

Further assessments should then be carried out as the design evolves to ensure that impacts from emissions are prevented or minimised as far as possible, and to fully quantify the expected effect of any proposed mitigation measures, including the cumulative effect where other nearby developments are also underway or likely to come forward".

Electric Vehicle Charging

A1.4 To support the uptake of zero tailpipe emission vehicles, Policy T6.1 of the London Plan states:

"All residential car parking spaces must provide infrastructure for electric or Ultra-Low Emission vehicles. At least 20 per cent of spaces should have active charging facilities, with passive provision for all remaining spaces".

London Environment Strategy

A1.5 The air quality chapter of the London Environment Strategy sets out three main objectives, each of which is supported by sub-policies and proposals. The Objectives and their sub-policies are set out below:

"Objective 4.1: Support and empower London and its communities, particularly the most disadvantaged and those in priority locations, to reduce their exposure to poor air quality.

- *Policy 4.1.1 Make sure that London and its communities, particularly the most disadvantaged and those in priority locations, are empowered to reduce their exposure to poor air quality*
- *Policy 4.1.2 Improve the understanding of air quality health impacts to better target policies and action*

Objective 4.2: Achieve legal compliance with UK and EU limits as soon as possible, including by mobilising action from London Boroughs, government and other partners

- *Policy 4.2.1 Reduce emissions from London's road transport network by phasing out fossil fuelled vehicles, prioritising action on diesel, and enabling Londoners to switch to more sustainable forms of transport*
- *Policy 4.2.2 Reduce emissions from non-road transport sources, including by phasing out fossil fuels*
- *Policy 4.2.3 Reduce emissions from non-transport sources, including by phasing out fossil fuels*
- *Policy 4.2.4 The Mayor will work with the government, the London boroughs and other partners to accelerate the achievement of legal limits in Greater London and improve air quality*

- *Policy 4.2.5 The Mayor will work with other cities (here and internationally), global city and industry networks to share best practice, lead action and support evidence based steps to improve air quality*

Objective 4.3: Establish and achieve new, tighter air quality targets for a cleaner London by transitioning to a zero emission London by 2050, meeting world health organization health-based guidelines for air quality

- *Policy 4.3.1 The Mayor will establish new targets for $PM_{2.5}$ and other pollutants where needed. The Mayor will seek to meet these targets as soon as possible, working with government and other partners*
- *Policy 4.3.2 The Mayor will encourage the take up of ultra low and zero emission technologies to make sure London's entire transport system is zero emission by 2050 to further reduce levels of pollution and achieve WHO air quality guidelines*
- *Policy 4.3.3 Phase out the use of fossil fuels to heat, cool and maintain London's buildings, homes and urban spaces, and reduce the impact of building emissions on air quality*
- *Policy 4.3.4 Work to reduce exposure to indoor air pollutants in the home, schools, workplace and other enclosed spaces"*

A1.6 While the policies targeting transport sources are significant, there are less obvious ones that will also require significant change. In particular, the aim to phase out fossil-fuels from building heating and cooling and from NRMM will demand a dramatic transition.

Low Emission Zone (LEZ)

A1.7 The LEZ was implemented as a key measure to improve air quality in Greater London. It entails charges for vehicles entering Greater London not meeting certain emissions criteria, and affects diesel-engined lorries, buses, coaches, large vans, minibuses and other specialist vehicles derived from lorries and vans. Since 1 March 2021, a standard of Euro VI has applied for HGVs, buses and coaches, while a standard of Euro 3 has applied for large vans, minibuses and other specialist diesel vehicles since 2012.

Ultra Low Emission Zone (ULEZ)

A1.8 London's ULEZ was introduced on 8 April 2019. The ULEZ currently operates 24 hours a day, 7 days a week in the same area as the current Congestion Charging zone. All cars, motorcycles, vans and minibuses are required to meet exhaust emission standards (ULEZ standards) or pay an additional daily charge to travel within the zone. The ULEZ standards are Euro 3 for motorcycles, Euro 4 for petrol cars, vans and minibuses and Euro 6 for diesel cars, vans and minibuses. The ULEZ does not include any requirements relating to heavy vehicle (HGV, coach and bus) emissions, as these are addressed by the amendments to the LEZ described in Paragraph A1.7.

A1.9 The ULEZ will covers the entire area within the North and South Circular roads, applying the emissions standards set out in Paragraph A1.8.

Other Measures

A1.10 Since 2018, all taxis presented for licencing for the first time had to be zero emission capable (ZEC). This means they must be able to travel a certain distance in a mode which produces no air pollutants, and all private hire vehicles (PHVs) presented for licensing for the first time had to meet Euro 6 emissions standards. Since January 2020, all newly manufactured PHVs presented for licensing for the first time had to be ZEC (with a minimum zero emission range of 10 miles). The Mayor's aim is that the entire taxi and PHV fleet will be made up of ZEC vehicles by 2033.

A1.11 The Mayor has also proposed to make sure that TfL leads by example by cleaning up its bus fleet, implementing the following measures:

- TfL will procure only hybrid or zero emission double-decker buses from 2018;
- a commitment to providing 3,100 double decker hybrid buses by 2019 and 300 zero emission single-deck buses in central London by 2020;
- introducing 12 Low Emission Bus Zones by 2020;
- investing £50m in Bus Priority Schemes across London to reduce engine idling; and
- retrofitting older buses to reduce emissions (selective catalytic reduction (SCR) technology has already been fitted to 1,800 buses, cutting their NOx emissions by around 88%).

A2 EPUK & IAQM Planning for Air Quality Guidance

A2.1 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

A2.2 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".

A2.3 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 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A2.4 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 m^2 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 mgNOx/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 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- 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 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A2.5 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".

A2.6 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

A2.7 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 m^2 of floor space for all other uses or a site area greater than 1 ha.

A2.8 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.

A2.9 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.

A2.10 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.

A2.11 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 NOx 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 NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

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".

A2.12 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".

A2.13 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".

A2.14 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

A2.15 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.

A2.16 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.

A2.17 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.

A2.18 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 A3.

A3 Professional Experience

Martin Peirce, BSc (Hons), MSc, MIEncSci, MIAQM

Mr Peirce has some thirty years' experience in environmental modelling and assessment, most relating to air quality and carbon and greenhouse gases (GHGs). He has extensive experience in the calculation of emissions to air and compiling emission inventories, for both local air quality assessments and carbon footprinting. For air quality, he also has extensive expertise in modelling the atmospheric dispersion of pollutants for comparison against regulatory limits and for assessment of health and environmental impacts. He has prepared assessments in support of Environmental Impact Assessments (EIA), permit applications and planning applications (under both Town and Country Planning Act (TCPA) and Development Consent Order (DCO) regimes). He has particular experience in modelling aviation and transport sources, non-road mobile machinery, construction and industrial sources.

Dr Wale Abiye, BTech (Hons) MSc, PhD, MIEnvSc MIAQM

Wale is an Assistant Consultant with AQC. Prior to joining the company, he worked as a Research Fellow in Nigeria where he obtained his master's and PhD degrees from Obafemi Awolowo University, Ile-Ife. He is experienced in monitoring urban air pollution and its chemical constituents, as well as using dispersion modelling to assess air quality.

A4 'Air Quality Neutral'

A4.1 The GLA's London Plan Guidance; Air Quality Neutral (GLA, 2021) provides an approach to assessing whether a development is air quality neutral. The approach is to compare the expected emissions from the building's energy use and vehicle trips against defined benchmarks for buildings and transport in London.

A4.2 The benchmarks for heating and energy plant (termed 'Building Emissions Benchmarks' or 'BEBs') are set out in Table A4.1, while the 'Transport Emissions Benchmarks' ('TEBs') are set out in Table A4.2.

A4.3 The average trip length and average emission per vehicle are required if there is a need to calculate offset payments. The values given by GLA are set out in Table A4.3 and Table A4.4 respectively.

Table A4.1: Building Emissions Benchmark NO_x Emission Rates ($gNO_x/m^2/annum$) [a]

Land Use [b]	Individual Gas Boilers	Gas Boiler Network	CHP + Gas Boiler Network	Heat Pumps + Gas Boiler Network
Residential (including student accommodation and large-scale purpose-built shared living development)	3.5	5.7	7.8	5.7
Retail	0.53	0.97	4.31	0.97
Restaurants and bars	1.76	3.23	14.34	3.23
Offices	1.43	2.62	11.68	2.62
Industrial	1.07	1.95	8.73	1.95
Storage and distribution	0.55	1.01	4.5	1.01
Hotel	9.47	15.42	38.16	15.42
Care homes and hospitals	9.15	14.9	36.86	14.9
Schools, nurseries, doctors' surgeries, other non-residential institutions	0.9	1.66	7.39	1.66
Assembly and leisure	2.62	4.84	21.53	4.84

[a] Solid and liquid biomass appliances also emit fine particulate matter in addition to NO_x. The benchmark emission rate for particulate matter is zero.

[b] Separate use classes for commercial uses, including retail and offices, have now been replaced by use class E. If these separate uses are specified in the development proposal, they should be used for this assessment. Where the intended use is not specified, or where use class E has been specified, the benchmark for retail should be used.

Table A4.2: Benchmark Trip Rates

Land Use	Annual trips per	Benchmark Trip Rates		
		Central Activities Zone (CAZ)	Inner London (excluding CAZ)	Outer London
Residential (including student accommodation and large-scale purpose-built shared living development)	dwelling	68	114	447
Office / Light Industrial	m^2 (GIA)	2	1	16
Retail (Superstore)	m^2 (GIA)	39	73	216
Retail (Convenience)	m^2 (GIA)	18	139	274
Restaurant / Café	m^2 (GIA)	64	137	170
Drinking establishments	m^2 (GIA)	0.8	8	N/A
Hot food takeaway	m^2 (GIA)	N/A	32.4	590
Industrial	m^2 (GIA)	N/A	3.9	16.3
Storage and distribution	m^2 (GIA)	N/A	1.4	5.8
Hotels	m^2 (GIA)	1	1.4	6.9
Care homes and hospitals	m^2 (GIA)	N/A	1.1	19.5
Schools, nurseries, doctors' surgeries, other non-residential institutions	m^2 (GIA)	0.1	30.3	44.4
Assembly and leisure	m^2 (GIA)	3.6	10.5	47.2

Table A4.3: Emission factors per vehicle-km

Pollutant	Emission factors (g/veh-km)		
	Central Activities Zone (CAZ)	Inner London [a] (excluding CAZ)	Outer London [a]
NOx	0.48	0.39	0.35
$PM_{2.5}$	0.036	0.032	0.028

[a] Inner London and Outer London as defined in the London Plan (GLA, 2021).

Table A4.4: Average Distance Travelled by Car per Trip

Land use	Distance (km)		
	Central Activity Zone	Inner	Outer
Residential	4.2	3.4	11.4
Office	3.0	7.2	10.8
Retail	9.2	5.5	5.4