

Air Quality Exposure Assessment – Codicote

For: Howarth Homes Ltd

Site: Former Big Cat Sanctuary, Codicote Road, Welwyn, AL6 9TU

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1. Introduction

1.1 Background

Howarth Homes Ltd (Client) are seeking planning permission for a residential development at the Former Big Cat Sanctuary, Codicote Road, Codicote, Welwyn, AL6 9TU.

Arthian Ltd has been appointed to provide an exposure assessment with regards to air quality.

1.2 Site Description

The proposed development is located on land directly southwest of the B656/Codicote Road in Welwyn. The site is bounded to the south by Fulling Mill Lane and residential properties, to the northeast by the B656, to the west by fields and green spaces and the north by woodland. A minority of the Proposed Development site is located within the administrative boundaries of Welwyn Hatfield Borough Council (WHBC), with the majority being located within the boundaries of North Hertfordshire District Council (NHDC). A location plan of the site and the surrounding area is shown below in Figure 1.1.

Figure 1.1: Site Location



© OpenStreetMap 2026



1.3 Proposed Development

The Proposed Development involves the redevelopment of the Former Big Cat Sanctuary site to deliver 109 residential dwellings, encompassing 99 houses, 10 apartment units, access arrangements (car and cycle parking), hard and soft landscaping and associated infrastructure works. The Proposed Development layout plan is shown in Figure 1.2 below.

Figure 1.2: Proposed Development Layout Plan



© OSP Architecture 2026

The assessment was undertaken in accordance with:

- Local Air Quality Management Technical Guidance (LAQM.TG22), published by the Department for Environment, Food and Rural Affairs (Defra) and the devolved administrations including (Department of Agriculture, Environment and Rural Affairs (DAERA)).
- IAQM Guidance on the assessment of dust from demolition and construction.
- Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) Land-Use Planning & Development Control: Planning for Air Quality guidance.

Typically, Air Quality Assessments may involve a qualitative assessment of the impact of construction activities at the site using the IAQM's Guidance on the assessment of dust from demolition and construction. As no information pertaining to construction activities at the site is currently available at the time of this report, the



construction dust risk assessment has been screened out of this Air Quality Assessment. This will be updated pending receipt of relevant construction information.

Subsequently, the assessment consisted of three main parts:

1.3.1 Baseline Air Quality

An assessment of the baseline air quality at the proposed development was undertaken by reviewing available documentation and monitoring data, based on Local Air Quality Management (LAQM) reports and data available from the Air Quality background maps and other LAQM tools.

1.3.2 Operational Impact on Surrounding Air Quality

Given the nature of the proposed development, it has been assumed that heating and hot water will not be generated using on-site fossil fuels. As such, potential impacts from energy centre emissions are negligible and have been excluded from further assessment.

Given the nature and size of the proposed development, a modelling assessment of potential impacts of road traffic emissions was undertaken. ADMS Roads was used to model the air quality impact at sensitive receptors adjacent to the modelled road network. A baseline air quality model was set up for a recent year (2024) and verified against local monitoring data. Once good agreement between modelled and monitored data was achieved, an assessment of air quality was carried out for the proposed opening year of the development.

The emissions data used for the modelling consisted of traffic data collated from the Department for Transport's traffic count points¹. The modelling considered the impact of emissions from traffic on the roads in the area, incorporating traffic flows split by vehicle category. One year (2024) of hourly sequential meteorological data from the London Stansted Airport weather station was used in the modelling.

Total concentrations of NO₂ and particulate matter (PM₁₀ and PM_{2.5}) at selected sensitive receptors (existing and proposed) in the surrounding area were calculated for direct comparison against Air Quality Objectives. Results are provided as tabulated values.

1.3.3 Impact of the Local Area on the Proposed Development

A review of existing air quality has been undertaken to determine the suitability of the site for its proposed uses. In addition to a qualitative review, several proposed receptors were included in the model to represent the location of future sensitive receptors (i.e. residential dwellings).

¹ <https://roadtraffic.dft.gov.uk/count-points>



2. Legislation, Policy & Guidance

2.1 Air Quality Limits & Assessment Levels

2.1.1 Air Quality Strategy

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland Volume 1 (Air Quality Strategy) establishes the policy for ambient air quality in the UK. It includes the National Air Quality Objectives (NAQOs) for the protection of human health and vegetation for 11 pollutants. Nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) are considered the pollutants of greatest concern in relation to the road traffic emissions from the development and are the focus of this air quality assessment.

Table 2 1 summarises the relevant NAQOs for that apply in England.

Table 2.1: NAQOs

Pollutant	Objective	Reference	Additional Information
NO ₂	200 µg/m ³	1-Hour Mean	Not to be exceeded more than 18 times a year (99.79 th percentile)
	40 µg/m ³	Annual Mean	-
PM ₁₀	50 µg/m ³	24-Hour Mean	Not to be exceeded more than 35 times a year (90.41 st percentile)
	40 µg/m ³	Annual Mean	-
PM _{2.5}	20 µg/m ³	Annual Mean	-

LAQM.TG22 summarises locations at which these objectives should apply, based on associated averaging periods. This has been reproduced in Appendix A. It is also noted that the objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (e.g. centre of roadways).

LAQM.TG22 states that in the absence of site-specific monitoring, exceedance of the 1-hour mean NO₂ objective is likely to occur where annual mean concentrations are in excess of an annual mean concentration of 60 µg/m³. Therefore, receptors will be assessed against an annual mean concentration of 60 µg/m³ for comparison against the 1-hour mean NO₂ objective.

For the PM₁₀ short-term (24-hour mean) objective, the number of potential annual exceedances can be estimated by using the following relationship within LAQM.TG22 in the absence of site-specific monitoring:

No. 24-hour mean exceedances = -18.5 + 0.00145 × annual mean³ + (206/annual mean).

2.2 National Legislation & Policy

2.2.1 National Planning Policy Framework (NPPF) (December 2024)

The latest guidance published in December 2024, the National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It provides a framework within which locally prepared



plans for housing and other development can be produced. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development. Current planning law requires that application for planning permissions must be determined in accordance with the relevant development plan (i.e. Local Plan or Neighbourhood Plan). The NPPF should be taken into account in the preparation of development plans and therefore the policies set out within the Framework are a material consideration in planning decisions.

Under paragraph 110, it states that:

“The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.”

Under paragraph 187(e), it 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 and water quality, taking into account relevant information such as river basin management plans.”

Under paragraph 199, it states 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.”

Additionally, with reference to data centres, paragraphs 86 and 87 state that:

“Planning policies should: [...]

c) pay particular regard to facilitating development to meet the needs of a modern economy, including by identifying suitable locations for uses such as laboratories, gigafactories, data centres, digital infrastructure, freight and logistics;”

“Planning policies and decisions should recognise and address the specific locational requirements of different sectors. This includes making provision for: [...]

a) clusters or networks of knowledge and data-driven, creative or high technology industries; and for new, expanded or upgraded facilities and infrastructure that are needed to support the growth of these industries (including data centres and grid connections).”



2.2.2 Control of Dust and Particulates Associated with Construction

Section 63 of the Clean Neighbourhoods and Environment Act (2011) states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

- 'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance'.
- 'Any accumulation or deposition which is prejudicial to health or a nuisance'.

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the development, the main potential for nuisance of this nature will arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes. There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. 'Nuisance' is a subjective term, and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

2.2.3 UK Clean Air Strategy 2019

The Defra Clean Air Strategy 2019 aims to show how the UK will tackle all sources of air pollution, make air healthier to breathe, protect nature and boost the economy.

The strategy builds on an extensive consultation process which indicated broad-based support for many of the actions Defra were proposing. There was also a range of constructive feedback and challenge that has enabled Defra to improve and extend its ambition even further in certain key areas. A document summarising the responses to the consultation is published alongside the strategy. The strategy sets out these proposals in detail and indicates how devolved administrations intend to make their share of emissions reductions.

2.3 Local Planning Policy

2.3.1 Welwyn Hatfield Local Plan 2016 – 2036 (Adopted 2023)

The Welwyn Hatfield Local Plan 2016 – 2036 was adopted in October 2023. It forms part of the Welwyn Hatfield Borough Council's statutory Development Plan and sets out the Council's policies and guidance related to the determination of planning applications and development within the Borough. The Plan contains the following policy related to air quality:

"Policy SADM 18

Environmental Pollution

...

Air Quality

Prevailing air quality and potential impacts upon air quality arising from airborne emissions, dust and odour associated with the construction and operation of a proposal (including vehicular traffic) will be considered when



determining planning applications. Proposals that would result in or be subject to unacceptable risk to human health and the natural environment from air pollution, or would prejudice compliance with national air quality objectives, will be refused.

An Air Quality Assessment that demonstrates how prevailing air quality and potential impacts upon air quality have been considered and how air quality will be kept to an acceptable standard through avoidance and mitigation will be required for major and minor development proposals that are:

- i. Likely, due to the nature of the proposal, to give rise to significant air pollution;*
- ii. Within an Air Quality Management Area;*
- iii. Within 50 metres of a major road ² or heavily trafficked route³ (66);*
- iv. Within proximity to a source of air pollution which could present a significant risk to human health; and/or*
- v. Particularly sensitive to air pollution due to their nature, such as schools, healthcare establishments or housing for older people.*

The potential impact of proposals upon odour levels, or their sensitivity to prevailing sources and levels of odour, should be considered and addressed. Where appropriate, the Council will require an Odour Impact Assessment to be provided, including an Odour Management Plan where necessary.

...”

2.3.2 North Hertfordshire Local Plan 2011 – 2031 (Adopted 2022)

The North Hertfordshire Local Plan 2011 – 2031 was adopted in November 2022. It is part of North Hertfordshire District Council’s statutory Development Plan for the District and sets out the Council’s policies and guidance related to planning and development within North Hertfordshire. The Plan contains the following policy related to air quality:

“Policy D4: Air Quality

Planning permission will be granted provided that development proposals:

- a) Give consideration to the potential or actual impact on local air quality, both during the demolition/construction phase and as a result of its final occupation and use;*
- b) Propose appropriate levels of mitigation to minimise emissions to the atmosphere and their potential effects upon health and the local environment; and*
- c) Carry out air pollution impact assessments, where required, to determine the impact on local air quality of the development.*

Where an air quality impact assessment demonstrates that a development is unacceptable from a local air quality perspective the development will be refused.

² As defined under the Environmental Noise (England) Regulations 2006 Regulation 3 (8) – trunk roads, motorways and principal or classified roads with more than three million vehicle passages a year; and considered by the Secretary of State to be regional, national or international. In 2016, the A1 (M), A414, A1000, A1001, A1057 and A6129 met this definition.

³ Heavily trafficked routes in the borough are defined as the B156, B197, B656, B1000 and Coopers Green Lane.



Where air pollution impact assessments are not required there will still be a requirement on developers to provide appropriate levels of mitigation to address emissions of pollutants to the atmosphere.”

2.4 Guidance

A summary of the publications referred to in the undertaking of this assessment is provided below.

2.4.1 Local Air Quality Management Review and Assessment Technical Guidance

Defra has published technical guidance for use by local authorities in their review and assessment work. This guidance, referred to in this document as LAQM.TG22, has been used where appropriate in the assessment presented herein.

2.4.2 Guidance on the Assessment of Dust from Demolition and Construction

Guidance on the Assessment of Dust from Demolition and Construction published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM₁₀ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

2.4.3 Land-Use Planning & Development Control: Planning For Air Quality

EPUK and the IAQM have published guidance that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.



3. Baseline Air Quality

3.1 Introduction

The existing air quality in the vicinity of the proposed development was reviewed in order to provide a baseline for the air quality assessment. The findings are summarised below.

3.2 Local Air Quality Management

The UK Air Quality Strategy establishes a framework for the improvement of air quality and focusses on measures agreed at a national and international level. However, it was recognised, that despite such strategic measures, areas of poor air quality would likely remain, and that these will best be dealt with using local measures implemented through the LAQM regime. Part IV of The Environment Act 1995 sets provisions for protecting air quality in the UK and for local air quality management.

Where a local authority identifies an area of non-compliance with the limit values set out in Table 2.1, and there is relevant public exposure, there remains a statutory need for the authority to declare the geographic extent of non-compliance as an Air Quality Management Area (AQMA) and to draw up an air quality action plan (AQAP) detailing remedial measures to address the problem.

WHBC has no declared AQMAs within its jurisdiction, while the nearest AQMA to the site declared by NHDC is located approximately 11.5km northwest of the Proposed Development, and as such does not have the potential to be impacted by traffic generated by the Proposed Development.

Considering the above, potential impacts on AQMAs have not been considered in this assessment.

3.3 Local Emissions Sources

3.3.1 Roads

The site is located in proximity to a number of local roads; in particular, it is directly adjacent to the B656/Codicote Road and Fulling Mill Lane. The B656/Codicote Road is considered to be the main source of emissions at the site.

3.3.2 Industrial Sources

A review of the 2024 EA Pollution Inventory⁴ indicates that there are no significant emission sources within 1km of the proposed development.

⁴ <https://www.data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory>



3.4 Air Quality Monitoring Data

A review of the available local monitoring data within WHBC and NHDC’s latest Annual Status Report (ASR)⁵ has been undertaken. WHBC operated 2 automatic monitoring sites and 51 non-automatic NO₂ diffusion tube locations in 2024, while NHDC operated no automatic monitoring locations and 35 non-automatic NO₂ diffusion tube locations. None of the automatic or non-automatic monitoring locations were located within 1km of the site.

3.4.1 Background Pollutant Data

1km square background data (as per Defra mapping data) was reviewed for comparison purposes against the NAQOs in Table 2.1. Annual mean data is presented in Table 3.1 below covering the site (OSGB36 grid reference 522500, 217500).

Table 3.1: Annual Mean Background NO₂, PM₁₀ and PM_{2.5}

Location	Grid Reference ⁶	Year	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
Site	522500, 217500	2021	8.8	12.6	7.3
		2022	8.6	12.5	7.3
		2023	8.4	12.4	7.2
		2024	8.1	12.3	7.1
		2025	7.8	12.2	7.0
		2026	7.5	12.1	6.9

Defra estimated background concentrations of NO₂, PM₁₀ and PM_{2.5} are below the air quality objectives and are predicted to decrease in future years. Defra has predicted background pollutant decreases in future years due to future developments in vehicle technology and changes to national and local policy.

⁵ https://www.airqualityengland.co.uk/assets/documents/WelwynHatfield/ASR_Welhat_2025.pdf
⁶ Central point of 1km x 1km square



4. Impact of Local Area on the Proposed Development

A review of existing air quality has been undertaken to determine the suitability of the site for its proposed uses. The proposals are for a residential development consisting of up to 109 units. As per Appendix A, both long and short-term objectives apply at the site.

Defra background data (Table 3.1) from the site and surrounding area indicates that concentrations of NO₂, PM₁₀ and PM_{2.5} are likely to be below their respective annual mean air quality.

LAQM.TG22 states that in the absence of site-specific monitoring, exceedance of the 1-hour mean NO₂ objective is likely to occur where annual mean concentrations are in excess of an annual mean concentration of 60 µg/m³. Therefore, receptors may be assessed against an annual mean concentration of 60 µg/m³ for comparison against the 1-hour mean NO₂ objective. SC and Defra estimated annual mean concentrations in the vicinity of the site are well below 60 µg/m³. This indicates that exceedance of the 1-hour mean NO₂ objective is unlikely to occur at the proposed development.

For the PM₁₀ short-term (24-hour mean) objective, the number of potential exceedances can be estimated by using the following relationship within LAQM.TG22 in the absence of site-specific monitoring:

$$\text{No. 24-hour mean exceedances} = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean})$$

Annual mean Defra background concentrations at the site are 12.1 µg/m³ in the current year (2026). Using the above formula, this leads to 1 exceedance day per year, which is below the maximum number of 35. As such, exceedances of the 24-hour mean objective is unlikely to occur at the proposed development.

Therefore, future users/occupants of the Proposed Development would not be exposed to unacceptable air quality, and the site is deemed suitable for its proposed future use in this respect.



5. Operational Air Quality

5.1 Model Choice

ADMS-Roads 5.1, the software used to undertake the operational assessment, incorporates the latest understanding of the boundary layer structure, and goes beyond the simplistic Pasquill-Gifford stability categories method with explicit calculation of important parameters. The model uses advanced algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions.

5.2 Model Scenarios

To determine the potential impact of road traffic emissions of the proposed development on sensitive human receptors, the following scenarios have been considered:

- 2024 Baseline year scenario, i.e. the latest year for which a full calendar year of ratified air quality monitoring data and traffic data is available. This scenario has been modelled to enable model verification;
- 2030 scenario, which describes the local road network in 2030, including traffic flows associated with cumulative developments and the proposed development.

5.3 Model Parameters

5.3.1 Traffic Data

The majority of the traffic data was collated from count points located via the Department for Transport's online traffic count database⁷, while the traffic data for Codicote Road was provided from a traffic survey conducted by RGP.

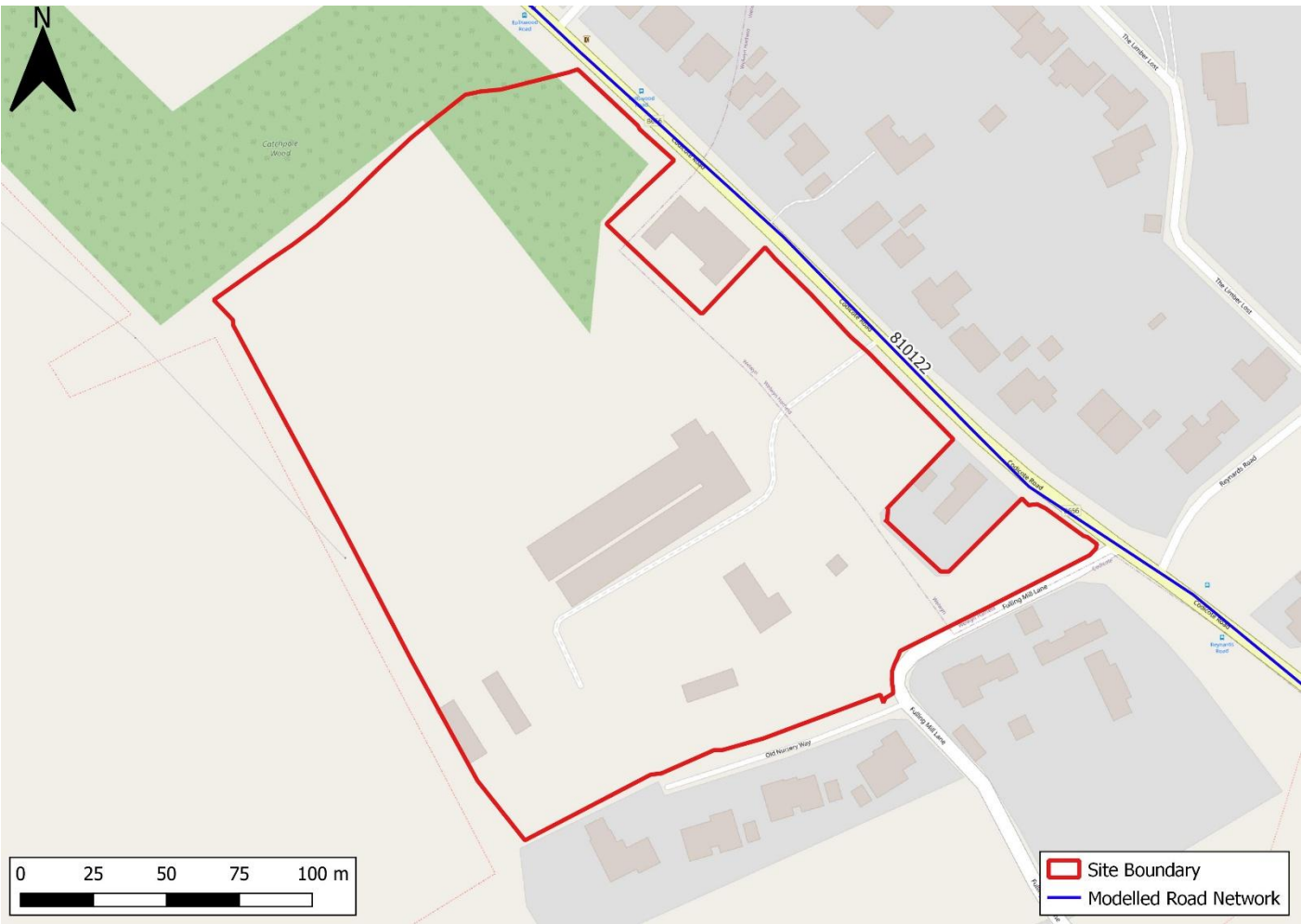
The traffic data was provided in two-way Annual Average Daily Traffic (AADT) flows and flow composition (Heavy and light duty vehicle percentage). The traffic data only includes those road links most impacted by the proposed development. Traffic speeds were derived from road speed limits with a speed reduction applied at junctions to account for congestion.

The modelled road network is shown in below in Figure 5.1.

⁷ <https://roadtraffic.dft.gov.uk/count-points>



Figure 5.1: Modelled Road Network



Full traffic data is provided below in Table 5.1 and Table 5.2.

Table 5.1: 2024 Traffic Data (calculated from 2026 traffic study)

Road Name	AADT	HDV%	Speed (kph)
B656/Codicote Road	8974.702	2.1%	57.1

Table 5.2: 2030 Traffic Data

Road Name	AADT	HDV%	Speed (kph)
B656/Codicote Road	9526	2.1%	57.1

5.3.2 Emissions from Road Traffic

The latest version of the Emissions Factors Toolkit (EFT v13.1, March 2025 release) was used in the model to calculate pollutant emission factors for each road link modelled. For the 2024 baseline model scenario, 2024 emissions were used.



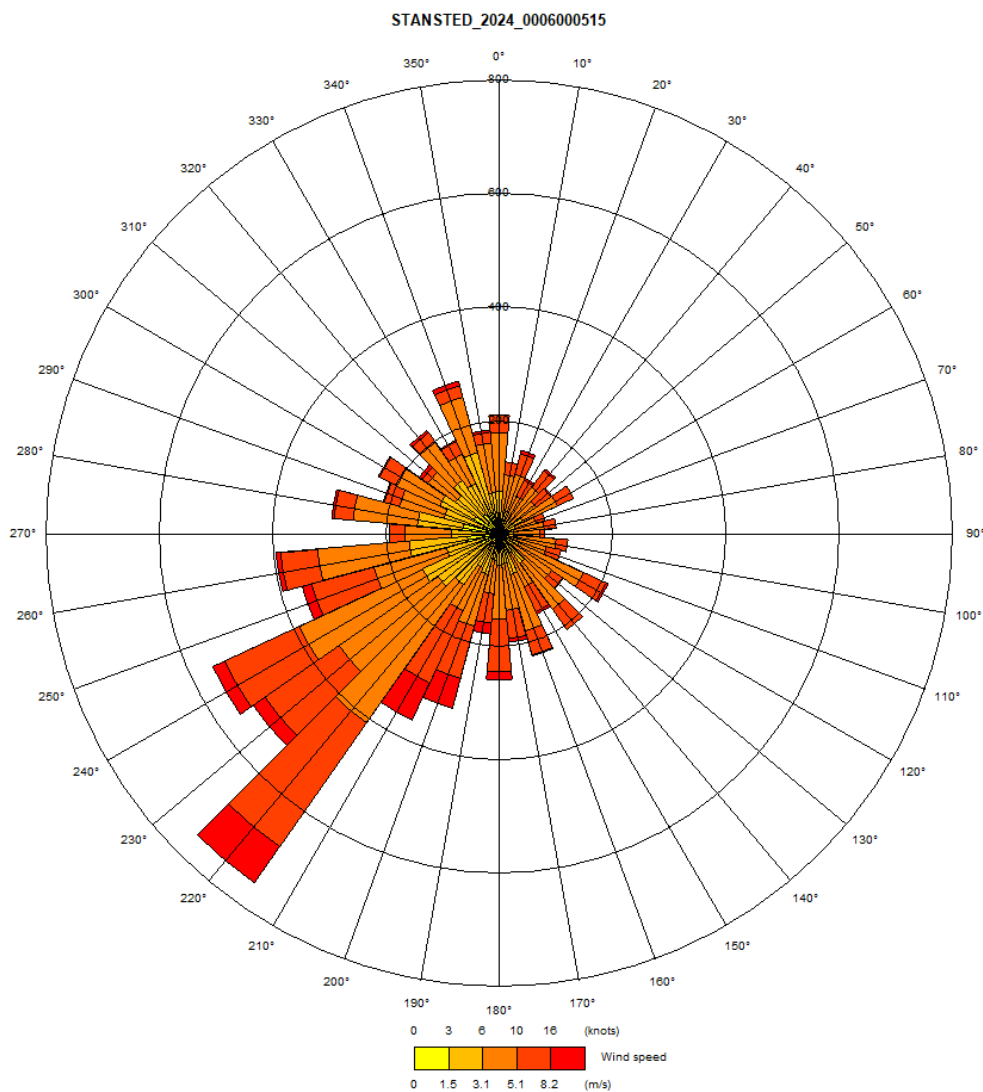
Nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) are considered the pollutants of greatest concern in relation to the road traffic emissions from the development and are the focus of this air quality modelling assessment.

For future year emissions the EFT emissions projections are based largely on the assumption that emissions from the fleet will reduce as newer / cleaner vehicles are introduced into the UK fleet, based on renewal rate forecast by the DfT. For the future opening year model scenarios, emissions were held at the baseline year (2024). This ensures a conservative assessment.

5.3.3 Meteorological Data

London Stansted Airport weather station (approximately 30 km to the east of the site) was used to provide hourly sequential meteorological data for the dispersion model. 2024 data was chosen to match the baseline verification scenario. A wind rose for the year 2024 is shown below in Figure 5.2.

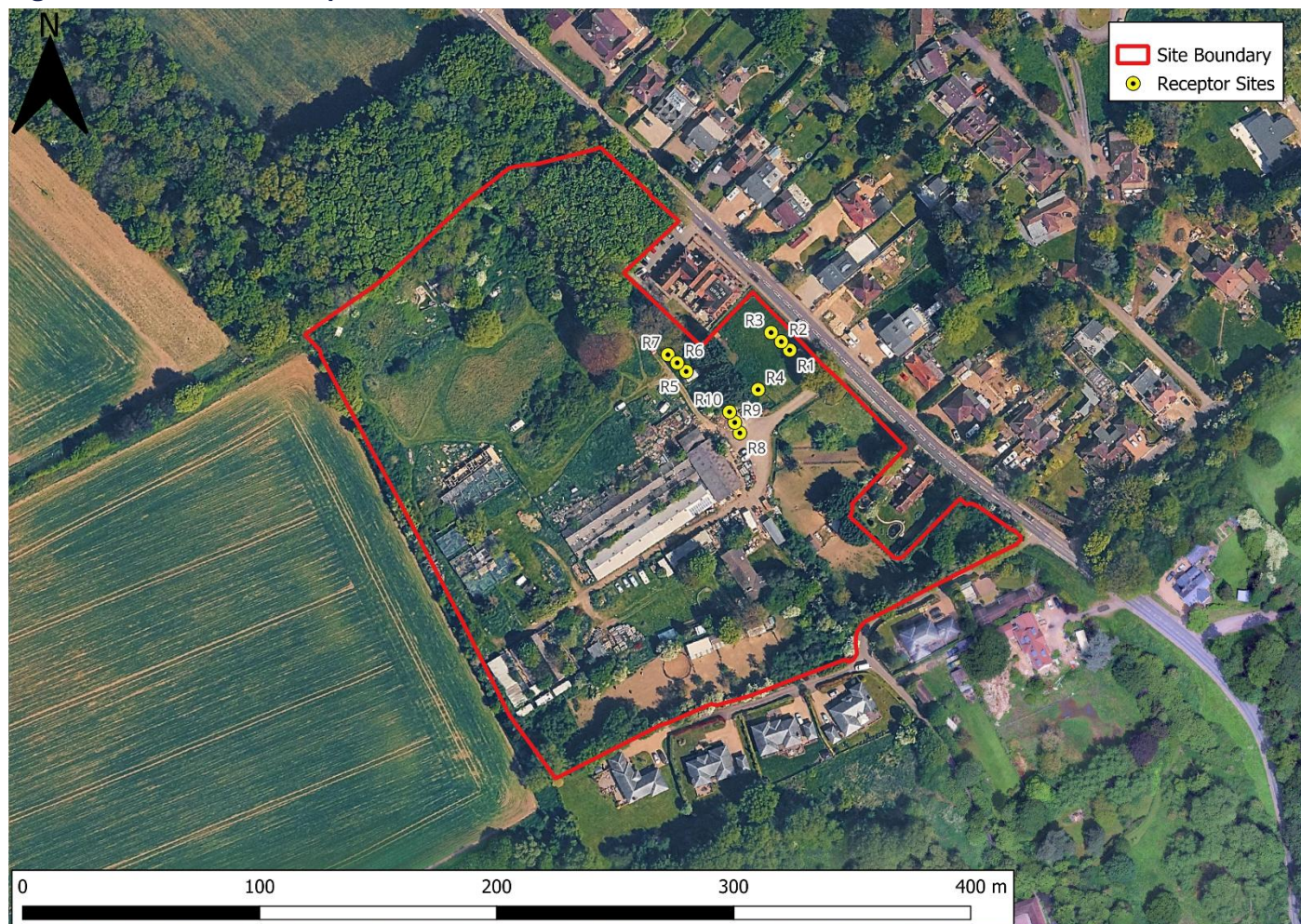
Figure 5.2: 2024 London Stansted Airport Wind Rose



5.3.4 Modelled Receptors

The modelled receptors included in this assessment are summarised in Table 5.3. These are proposed receptors which represent worst-case sensitive locations (e.g. residential dwellings) of the Proposed Development, based on the layout plans provided in Figure 1.2. All receptors were modelled at a 'breathable height' of 1.8m above ground level. The receptor locations are also shown in Figure 5.3.

Figure 5.3: Modelled Receptors



© Google Satellite 2026

Table 5.3 Modelled Human Receptors

ID	Receptor Location	X Coordinate (m)	Y Coordinate (m)
R1	Proposed Plot 1	522502	217200
R2	Proposed Plot 2	522498	217204
R3	Proposed Plot 3	522494	217207
R4	Proposed Plot 4	522488	217183
R5	Proposed Plot 5	522458	217191
R6	Proposed Plot 6	522454	217195
R7	Proposed Plot 7	522450	217198



R8	Proposed Plot 38	522481	217165
R9	Proposed Plot 39	522479	217169
R10	Proposed Plot 40	522476	217174

5.3.5 Background Data

The Defra background mapped NO₂, PM₁₀ and PM_{2.5} concentrations for the year 2024 were used to define the background concentrations for the modelled receptors. Data for 2024 was used for the assessment in both the model verification and without and with development scenarios for a conservative approach, assuming no background concentration reductions in any pollutants between 2024 and the future opening year.

5.3.6 NO_x to NO₂ Conversion

Vehicle exhaust emissions were modelled as NO_x and the annual mean results subsequently converted to total NO₂ for comparison with air quality objectives, using the LAQM NO_x to NO₂ calculator published on the Defra website (version 9.1, August 2024)). The traffic mix was specified as “all UK traffic”. The ADMS Roads chemistry module was not utilised.

5.3.7 Other Parameters

Additional information on other model parameters are summarised in Table 5.4 below.

Table 5.4: Other Model Parameters

Parameters	Comment
Surface Roughness	A surface roughness length is used to characterise the texture of land. 1.0 m at the development site (e.g. cities) was used.
Complex Terrain	The assessment area of is relatively small and does not include significant variation in terrain heights. Complex terrain has therefore not been included within the model.
Dry and Wet Deposition	Not modelled.

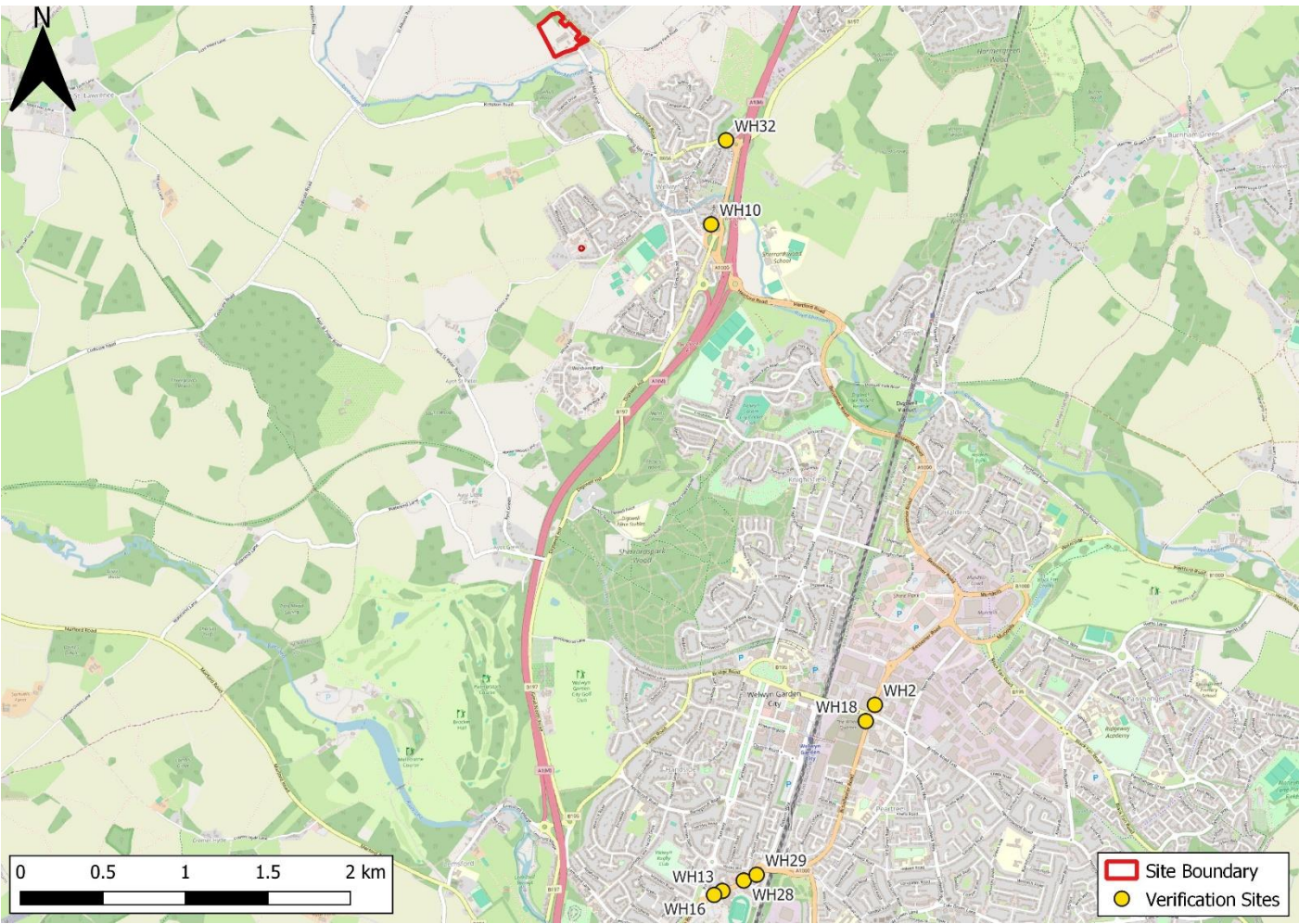
5.4 Model Verification

Model verification is the process of comparing calculated (modelled) concentrations with measured data (i.e. from monitoring stations). It is considered good practice to verify a dispersion model to highlight any potential discrepancies in the model parameters prior to undertaking any impact assessment, and this is typically done using roadside monitoring locations.

The model was verified based on 2024 WHBC data for roadside monitoring stations (see below), using annual mean predicted results for NO_x and NO₂. In addition to the locations considered in Figure 5.3 above, several other monitoring points surrounding the site have been included (see Figure 5.4 below) to provide sufficient data for model verification.



Figure 5.4: Verification Site Locations



© OpenStreetMap 2026



The comparison between the modelled predictions and monitored data are summarised in Table 5.5.

Table 5.5: Monitored and Modelled Road Contributed NO_x and Total NO₂ for 2024 – Pre Adjustment

Monitoring ID	Modelled Road Contributed NO _x (Excluding Background) (µg/m ³)	Monitored Road Contributed NO _x (Excluding Background) (µg/m ³)	Modelled NO ₂ (Including Background) (µg/m ³)	Monitored NO ₂ (µg/m ³)	% Difference in NO ₂
WH2	6.73	1.8	16.9	15.6	8.5%
WH10	3.06	9.6	12.2	20.3	-40.0%
WH13	2.32	4.1	11.8	14.8	-20.1%
WH16	5.49	14.0	14.0	25.4	-44.8%
WH18	5.18	12.5	13.9	23.9	-42.0%
WH28	2.57	7.4	13.4	19.6	-31.5%
WH29	4.74	5.7	13.7	17.1	-20.1%
WH32	7.44	3.9	14.9	15.3	-2.5%

Table 5.5 shows that the model falls outside +/- 25% of monitored concentrations at four locations. In accordance with LAQM.TG22, an adjustment factor has been derived.

Following analysis, the decision was made not to discount any locations and an adjustment factor of 2.9 was derived. The modelled road contributed NO_x was then adjusted by this factor and then converted to total NO₂ using the Defra NO_x-NO₂ calculator.

The RMSE is 5.0, which is within 25% of the NO₂ NAQO as recommended within LAQM.TG22. This is therefore considered appropriate for use within the Air Quality Assessment.

Table 5.6 shows the results from the post verification adjustment factor.

Table 5.6: Monitored and Modelled Road Contributed NO_x and Total NO₂ for 2024 – Post Adjustment

Monitoring ID	Adjusted Modelled Road NO _x	Adjusted Modelled NO ₂ (Including Background) (µg/m ³)	Monitored NO ₂ (µg/m ³)	% Difference in NO ₂
WH2	19.9	22.7	15.6	45.3%
WH10	9.1	15.0	20.3	-26.3%
WH13	6.9	14.0	14.8	-5.6%
WH16	16.2	18.9	25.4	-25.8%
WH18	15.3	18.5	23.9	-22.8%
WH28	7.6	15.8	19.6	-19.5%
WH29	14.0	17.9	17.1	4.6%



Monitoring ID	Adjusted Modelled Road NO _x	Adjusted Modelled NO ₂ (Including Background) (µg/m ³)	Monitored NO ₂ (µg/m ³)	% Difference in NO ₂
WH32	22.0	21.3	15.3	39.2%

In accordance with Defra guidance, the road contributed NO_x adjustment factor was also applied to the road contributed PM concentrations. The total PM₁₀ and PM_{2.5} concentrations are derived by adding the adjusted road contribution value to the Defra background concentrations.



5.5 Model Results

The predicted NO₂, PM₁₀ and PM_{2.5} concentrations at nearby receptor concentrations are presented in the following tables.

- Table 5.7 provides the predicted annual mean NO₂ concentrations.
- Table 5.8 provides the predicted annual mean PM₁₀ concentrations.
- Table 5.9 provides the predicted number of annual exceedances of 24-hour mean PM₁₀ NAQO of 50µg/m³
- Table 5.10 provides the predicted annual mean PM_{2.5} concentrations.

Predicted concentrations for the baseline year, 2024, and the expected initial operating year, 2030, are presented.

The predicted results are deemed to be conservative and robust given that emissions and backgrounds have been held at the baseline year (2024) for the future opening year scenario, therefore assuming no improvement in future years.

5.5.1 Annual Mean NO₂

The maximum NO₂ concentration at the development in 2030 is 16.5 µg/m³ at receptors R1, R2 and R3, which is 59% below the 40 µg/m³ objective. The minimum NO₂ concentration is 16.3 µg/m³ at all other receptors, which is 59% below the objective.

Table 5.7: Predicted Annual Mean NO₂ Concentrations and Assessed Impact

Receptor ID	Predicted NO ₂ Concentration (µg/m ³)	
	2024	2030
R1	16.8	16.5
R2	16.8	16.5
R3	16.8	16.5
R4	16.5	16.3
R5	16.4	16.3
R6	16.4	16.3
R7	16.4	16.3
R8	16.4	16.3
R9	16.4	16.3
R10	16.4	16.3



5.5.3 Hourly Mean NO₂

LAQM.TG22 states that exceedance of the 1-hour mean NO₂ objective is likely to occur where annual mean concentrations are in excess of an annual mean concentration of 60 µg/m³. Review of the annual mean NO₂ modelled concentrations (Table 5.7) shows a maximum concentration in 2030 of 16.5 µg/m³ at R1, R2 and R3 which is 72% below the 60 µg/m³ threshold, and a minimum concentration of 16.3 µg/m³ at all other receptors which is 72.8% below the objective.

5.5.4 Annual Mean PM₁₀

The maximum PM₁₀ concentration at the development in 2030 is 12.5 µg/m³ at receptors R1, R2 and R3 (Table C.3), which is 68.8% below the 40 µg/m³ objective. The minimum concentration is 12.4 µg/m³ at all other receptors, which is 69.1% below the objective.

Table 5.8: Predicted Annual Mean PM₁₀ Concentrations and Assessed Impact

Receptor ID	Predicted PM ₁₀ Concentration (µg/m ³)	
	2024	2030
R1	12.5	12.5
R2	12.5	12.5
R3	12.5	12.5
R4	12.4	12.4
R5	12.4	12.4
R6	12.4	12.4
R7	12.4	12.4
R8	12.4	12.4
R9	12.4	12.4
R10	12.4	12.4

5.5.5 24-hour Mean PM₁₀

For the PM₁₀ short-term (24-hour mean) objective, the number of potential exceedances can be estimated by using the following relationship within LAQM.TG22 in the absence of site-specific monitoring:

$$\text{No. 24-hour mean exceedances} = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean})$$

Through this relationship it is calculated that the 24-hour PM₁₀ NAQO of 50 µg/m³ would not be exceeded more than 35 times per year at any of the modelled existing human receptors as detailed in Table 5.9.

The maximum number of estimated exceedances is 1 for all receptors.



Table 5.9: Predicted Number of Annual Exceedances of 24-Hour Mean PM₁₀ NAQO

Receptor ID	Number of Annual Exceedances of 24-Hour Mean PM ₁₀ NAQO of 50(µg/m ³)	
	2024	2030
R1	0.8	0.8
R2	0.8	0.8
R3	0.8	0.8
R4	0.9	0.9
R5	0.9	0.9
R6	0.9	0.9
R7	0.9	0.9
R8	0.9	0.9
R9	0.9	0.9
R10	0.9	0.9

5.5.6 Annual Mean PM_{2.5}

The maximum PM_{2.5} concentration at the development in 2030 is 7.2 µg/m³ at receptors R1 – R3, which is 64% below the 20 µg/m³ objective. The minimum concentration is 7.1 µg/m³ at receptors R4 – R10, which is 64.4% below the objective.



Table 5.10: Predicted Annual Mean PM_{2.5} Concentrations and Assessed Impact

Receptor ID	Predicted PM _{2.5} Concentration (µg/m ³)	
	2024	2030
R1	7.2	7.2
R2	7.2	7.2
R3	7.2	7.2
R4	7.14	7.14
R5	7.13	7.13
R6	7.13	7.13
R7	7.13	7.13
R8	7.13	7.13
R9	7.13	7.13
R10	7.13	7.13



6. Conclusions

An assessment of the potential air quality concentrations in the opening year of the proposed development was undertaken, both during the construction phase and under the operational phase.

As yet, no construction data has been provided, and so a construction dust air quality assessment has not been undertaken. This will be updated pending receipt of construction data.

Regarding the suitability of air quality at the site for its intended uses, a review of baseline air quality data indicated that pollutant concentrations at the site are likely to be below the relevant health-based objectives. As such, the future occupants and users of the proposed development would not be exposed to unacceptable air quality, and the site is deemed suitable for its proposed future uses in this respect.

ADMS Roads was used to assess the likely air quality impact of the proposed development once it opens, with respect to NO₂, PM₁₀ and PM_{2.5} emissions. The modelling focussed on determining the potential impact of increased traffic flows from the proposed development on selected existing and proposed sensitive receptors. All predicted annual mean NO₂, PM₁₀ and PM_{2.5} impacts, and 24-hour mean PM₁₀ impacts, at receptors were shown to be negligible, in accordance with IAQM criteria.

The overall impacts of the proposed development on local air quality are considered to be not significant. The proposed development is considered to be compliant with national and local policy including the Welwyn Hatfield Local Plan 2016–2036 (adopted 2023) and the North Hertfordshire Local Development Plan 2011–2031 (adopted 2022).



Appendices



Appendix A: Examples of Where Air Quality Objectives Should Apply



Averaging Period	Objectives should apply at:	Objectives should not generally apply at:
Annual Mean	• All locations where members of the public might be regularly exposed. • Building facades of residential properties, schools, hospitals, care homes, etc.	• Building facades of offices or other places of work where members of the public do not have regular access. • Hotels, unless people live there as their permanent residence. • Gardens of residential properties. • Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24 Hour Mean and 8 Hour Mean	• All locations where the annual mean objectives would apply, together with hotels. • Gardens of residential properties.	• Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1 Hour Mean	• All locations where the annual mean and 24 and 8 hour mean objectives would apply. • Kerbside sites (e.g. pavements of busy shopping streets). • Those parts of car parks, bus stations and railway stations, etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. • Any outdoor locations at which the public may be expected to spend one hour or longer.	• Kerbside sites where the public would not be expected to have regular access.
15 Minute Mean	• All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

