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The Old Mission House 44 Waterloo Road, Uxbridge: Air Quality Assessment

**Prepared for
Uxbridge Property Ltd
C/O Jaspar Management Limited**

**Report Ref: AQ1071
Date: May 2017**

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Air Quality Assessment

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1 INTRODUCTION

1.1 Scope

GEM Air Quality Ltd has been commissioned to undertake a detailed air quality assessment based on the potential impacts of existing and future traffic levels on a proposed residential development located at the Old Mission House, 44 Waterloo Road in Uxbridge, Middlesex. The pollutants modelled as part of this assessment are nitrogen oxides (NO_x) and particulate matter (PM₁₀).

The impacts of vehicle emissions have been assessed using the techniques detailed within Volume 11, Section 3 of the Design Manual for Roads and Bridges (DMRB)¹ and the London Local Air Quality Management Technical Guidance (LLAQM.TG16)². The impact of road traffic emissions will be assessed using the ADMS-Roads Extra air dispersion model. This model has been devised by Cambridge Environmental Research Consultants (CERC) and is described as a *“comprehensive tool for investigating air pollution problems due to small networks of roads”*.

It should be noted that the short-term impacts of NO₂ and PM₁₀ emissions have not been modelled as dispersion models are inevitably poor at predicting short-term peaks in pollutant concentrations, which are highly variable from year to year, and from site to site. Notwithstanding this, general assumptions have been made about short term concentrations based on the modelled annual mean concentrations.

¹ Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 – HA207/07, Highways Agency, May 2007

² London Local Air Quality Management (LLAQM), Technical Guidance, April 2016 (LLAQM.TG (16))

2 POLLUTANTS & LEGISLATION

2.1 Pollutant Overview

In most urban areas of the UK, traffic generated pollutants have become the most common pollutants. These are nitrogen dioxide (NO₂), fine particulates (PM₁₀), carbon monoxide (CO), 1,3-butadiene and benzene, as well as carbon dioxide (CO₂). This air quality assessment focuses on NO₂ and PM₁₀, as these pollutants are least likely to meet their Air Quality Strategy objectives near roads. Table 1 provides an overview of NO₂ and PM₁₀.

Table 1 – Overview of NO₂ and PM₁₀

Pollutant	Properties	Anthropogenic Sources	Natural Sources	Potential Effects
Particles (PM₁₀)	Tiny particulates of solid or liquid nature suspended in the air	Road transport; Power generation plants; Production processes e.g. windblown dust	Soil erosion; Volcanoes; Forest fires; Sea salt crystals	Asthma; Lung cancer; Cardiovascular problems
Nitrogen Dioxide (NO₂)	Reddish-brown coloured gas with a distinct odour	Road transport; Power generation plants; Fossil fuels – extraction & distribution; Petroleum refining	No natural sources, although nitric oxide (NO) can form in soils	Pulmonary edema; Various environmental impacts e.g. acid rain

2.2 Air Quality Strategy

The UK Government and the devolved administrations published the latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland on 17 July 2007³. The Strategy provides an over-arching strategic framework for air quality management in the UK by way of the following:

- setting out a way forward for work and planning on air quality issues;
- setting out the air quality standards and objectives to be achieved;
- introducing a new policy framework for tackling fine particles; and
- identifying potential new national policy measures which modelling indicates could give further health benefits and move closer towards meeting the Strategy's objectives.

With regards to this assessment, the Air Quality Strategy contains national air quality standards and objectives established by the Government to protect human health. The objectives for nitrogen dioxide and particulates (PM₁₀ and PM_{2.5}) have been set, along with

³ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, July 2007

seven other pollutants (benzene, 1,3-butadiene, carbon monoxide, lead, PAHs, sulphur dioxide and ozone). Those which are limit values required by EU Daughter Directives on Air Quality have been transposed into UK law through the Air Quality Standards Regulations 2010 which came into force on 11th June 2010. Table 2 provides the UK Air Quality Objectives for NO₂ and PM₁₀.

Table 2 – UK Air Quality Objectives for Nitrogen Dioxide and Particulate Matter

Pollutant	Objective	Concentration measured as
Particles (PM ₁₀)	50µg/m ³ not to be exceeded more than 35 times a year	24 hour mean
	40µg/m ³	Annual mean
Particles (PM _{2.5})	25µg/m ³ (except Scotland)	Annual Mean
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1 hour mean
	40µg/m ³	Annual mean

Objectives for PM_{2.5} were also introduced by the UK Government and the Devolved Administrations in 2010. However, these are not included in Regulations as the Air Quality Strategy has adopted an “exposure reduction” approach for PM_{2.5} in order to seek a more efficient way of achieving further reductions in the health effects of air pollution by providing a driver to improve air quality everywhere in the UK rather than just in a small number of localised hotspot areas.

As defined in Table 4, background PM_{2.5} concentrations are well below the limit value of 25.0 µg/m³. As such, no further consideration has been given to PM_{2.5} within this assessment.

2.3 London Local Air Quality Management (LLAQM)

At the core of LLAQM delivery are three pollutant objectives; these are: nitrogen dioxide (NO₂), particulate matter (PM₁₀) and sulphur dioxide (SO₂). All current Air Quality Management Areas (AQMA) across the UK are declared for one or more of these pollutants, with NO₂ accounting for the majority. In Greater London, AQMA are declared for NO₂ and PM₁₀ in equal proportions. It is a statutory requirement for local authorities to regularly review and assess air quality in their area and take action to improve air quality when objectives set out in regulation cannot be met.

2.3.1 London Borough of Hillingdon

The London Borough of Hillingdon has declared an Air Quality Management Area (AQMA). The AQMA encompasses an area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line. As such, the proposed development lies within this AQMA.

3 PLANNING POLICY & GUIDANCE

3.1 National Planning Policy & Guidance

3.1.1 National Planning Policy Framework

On a national level, air quality can be a material consideration in planning decisions. The National Planning Policy Framework (NPPF) for England, released on 27th March 2013, is considered a key part of the Governments reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. The NPPF replaces the Planning Policy Statement 23 (PPS23) *Planning and Pollution Control*⁴.

The NPPF states that the “planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability”.

It goes on to state that “planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan”.

3.1.2 Land-Use Planning & Development Control

In January 2017, Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) produced guidance to ensure that air quality is adequately considered in the land-use planning and development control processes⁵.

The guidance document is particularly applicable to assessing the effect of changes in exposure of members of the public resulting from residential and mixed-use developments, especially those within urban areas where air quality is poorer. It is also relevant to other forms of development where a proposal could affect local air quality and for which no other guidance exists.

⁴ Planning Policy Statement 23: Planning and Pollution Control, Office of the Deputy Prime Minister (ODPM), November 2004

⁵ Land-Use Planning & Development Control: Planning for Air Quality. Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes. EPUK & IAQM. January 2017

3.2 Local Planning Policy

3.2.1 The Mayor's Air Quality Strategy

In October 2010, the Mayor's Air Quality Strategy⁶ was released. The strategy sets out a framework for delivering improvements to London's air quality and includes measures aimed at reducing emissions from transport, homes, offices and new developments, as well as raising awareness of air quality issues and its impact on health.

3.2.2 The London Plan

In March 2016, the updated London Plan was published by the Greater London Authority⁷. The London Plan provides an overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years. The Plan brings together the geographic and locational aspects of the Mayor's other strategies, including a range of environmental issues such as climate change (adaptation and mitigation), air quality, noise and waste.

Policy 7.14 relates specifically to improving air quality and states the following:

"The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimize public exposure to pollution".

It goes on to state the following with regards to planning decisions:

"Development proposals should:

- a minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)*
- b promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'*

⁶ Clearing the Air: The Mayor's Air Quality Strategy. October 2010

⁷ The London Plan. The Spatial Development Strategy for London. Consolidated with Alterations. March 2016

- c be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs)).*
- d ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches*
- e where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified".*

3.2.3 Supplementary Planning Guidance (SPG)

Sustainable Design and Construction SPG

The Greater London Authority (GLA) released the "Sustainable Design and Construction" SPG in July 2014⁸. The SPG aims to support developers, local planning authorities and neighbourhoods to achieve sustainable development. It provides guidance on to how to achieve the London Plan objectives effectively, supporting the Mayor's aims for growth, including the delivery of housing and infrastructure.

In relation to air quality the SPG provides guidance on the following key areas:

- assessment requirements;
- construction and demolition;
- design and occupation;
- air quality neutral policy for buildings and transport; and
- emissions standards for combustion plant

⁸ Sustainable Design and Construction SPG. Greater London Authority, July 2014

4 ASSESSMENT METHODOLOGY

4.1 Operational Phase (Traffic Emissions)

4.1.1 Modelled Scenarios

A future year has been chosen (2020) for the assessment, along with the baseline year (2015). The future year represents the assumed first full year of occupation following completion of the development. Two scenarios have been adopted as part of the assessment. These are as follows:

- **Scenario 1** – existing levels of air quality (2015); and
- **Scenario 2** – future impact of traffic emissions on the proposed development i.e. introduction of new exposure (2020).

Predicted concentrations will be compared to the Air Quality Strategy objectives. Background pollutant concentrations and vehicle emission rates for all modelled years are based on the latest data issued by Defra. These background concentrations and emission factors are discussed further in the following sections.

4.1.2 ADMS-Roads

Modelling the impact of traffic emissions on the proposed development will be undertaken using the latest version of the ADMS-Roads model⁹. ADMS-Roads is significantly more advanced than that of most other air dispersion models in that it 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.

4.1.3 Emission Factors

Defra and the Devolved Administrations have provided an updated Emission Factors Toolkit (Version 7.0) which incorporates updated NO_x emissions factors and vehicle fleet information¹⁰. These emission factors have been integrated into the latest ADMS-Roads modelling software. However, in order to undertake a worst-case assessment emission factors for 2015 have been used for all modelled years.

4.1.4 Traffic Data

Baseline traffic flows along the local roads are available from the London Atmospheric Emissions Inventory (LAEI)¹¹. Baseline data from the LAEI has been projected to 2015 and

⁹ Model Version: 4.1.1.0. Interface Version 4.1.0 (27/02/2017)

¹⁰ http://laqm.defra.gov.uk/documents/EFT2016_v7.0.xlsm.zip

¹¹ LAEI (2008), Greater London Authority

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2020. Projection of traffic data has been undertaken using growth factors specific to the London Borough of Hillingdon, obtained from TEMPro¹² and National Road Traffic Forecasts (NRTF)¹³. The projected flow rates are provided in Table 3. It is assumed that the percentage HDV and speed will remain unchanged in future years. Cowley Mill Road has been modelled for the purposes of model verification.

For the modelled speeds, the figures provided above have been used and have been derived from the London Atmospheric Emissions Inventory (LAEI). However, where a link approaches a junction a speed of 20 kph has been modelled in order to represent queuing traffic at a junction.

Table 3 – Annual Average Daily Traffic Flows, Percentage HDV and Speeds for Modelled Roads

Link Name	AADT 2015	AADT 2020	HDV (%)	Speed (kph)
A4007 Rockingham Road	12,329	13,451	9.3%	32
Cowley Mill Road	13,976	15,248	10.4%	15

4.1.5 Street Canyons

A street canyon may be defined as a relatively narrow street with buildings on both sides, where the height of the buildings is generally greater than the width of the road. Street canyons may result in elevated pollutant concentrations from road traffic emissions due to a reduced likelihood of the pollutants becoming dispersed in the atmosphere. Street canyons have not been modelled as part of this assessment.

¹² Tempro (Trip End Model Presentation Program) version 6 , dataset v5.4 Department for Transport

¹³ National Road Traffic Forecasts (Great Britain) 1997, Department for Transport

4.2 Background Concentrations

Background NO_x, NO₂ and PM₁₀ concentrations have been obtained from Defra¹⁴. These 1 km x 1 km grid resolution maps are derived from a base year of 2013 (for NO_x, NO₂, PM₁₀ and PM_{2.5} only), which are then projected to future years (2015). Background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} derived from Defra are provided in Table 4.

Table 4 – Background NO_x, NO₂, PM₁₀ and PM_{2.5} Concentrations

Pollutant	X	Y	2015
NO ₂	505500	183500	27.0
NO _x			42.2
PM ₁₀			18.2
PM _{2.5}			13.3

In order to undertake a worst-case assessment, 2015 background concentrations have been assumed for all modelled scenarios.

4.3 Surface Roughness

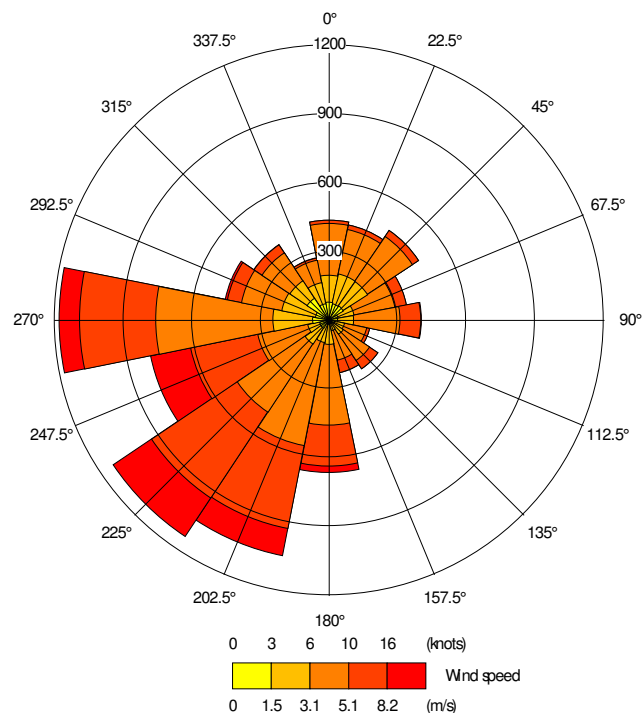
A surface roughness of 1.5 metre has been used in the model. This value is provided by ADMS-Roads as a typical roughness length for large urban areas. This value has been used across the modelled domain.

¹⁴ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>

4.4 Meteorological Data

Hourly sequential meteorological data from the Heathrow Airport meteorological station has been used. Wind speed and direction data from the Heathrow Airport meteorological station has been plotted as a wind rose in Figure 1.

Figure 1 – Wind Speed and Direction Data, Heathrow Airport (2015)



4.5 Model Output

4.5.1 NO_x/NO₂ Relationship

Following recent evidence that shows the proportion of primary NO₂ in vehicle exhaust has increased¹⁵. As such, a new NO_x to NO₂ calculator has been devised¹⁶. This new calculator has been used to determine NO₂ concentrations for this assessment, based on predicted NO_x concentrations using ADMS-Roads. Converted NO₂ concentrations are initially compared to local monitoring data in order to verify the model output. If the model performance is considered unacceptable then the NO_x concentrations are adjusted before conversion to NO₂.

4.5.2 Predicted Short Term Concentrations

As discussed in the introduction, it has not been possible to model the short-term impacts of NO₂ and PM₁₀. Research undertaken in 2003¹⁷ has indicated that the hourly NO₂ objective is unlikely to be exceeded at a roadside location where the annual mean NO₂ concentration is less than 60 µg/m³.

For PM₁₀, a relationship between the annual mean and the number of 24-hour mean exceedences has been devised and is as follows:

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

This relationship has been applied to the modelled annual mean concentrations in order to estimate the number of 24-hourly exceedences.

4.5.3 Model Verification

The Council undertakes monitoring of NO₂ at a number of roadside sites. Monitored concentrations from the HD52 monitoring site has been used for the purposes of model verification. The location of this verification site is provided in Table 5.

Table 5 – Modelled Verification Locations

Site ID	Location	X	Y	Height (m)
HD52	Lamp post near 101 Cowley Mill Road	505159	183232	1.5

¹⁵ Trends in Primary Nitrogen Dioxide in the UK, Air Quality Expert Group, 2007

¹⁶ http://laqm.defra.gov.uk/documents/no2tonox9_ja-forweb_june2016.xls

¹⁷ Analysis of Relationship between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites, Laxen and Marner, 2003

4.5.4 Receptor Locations

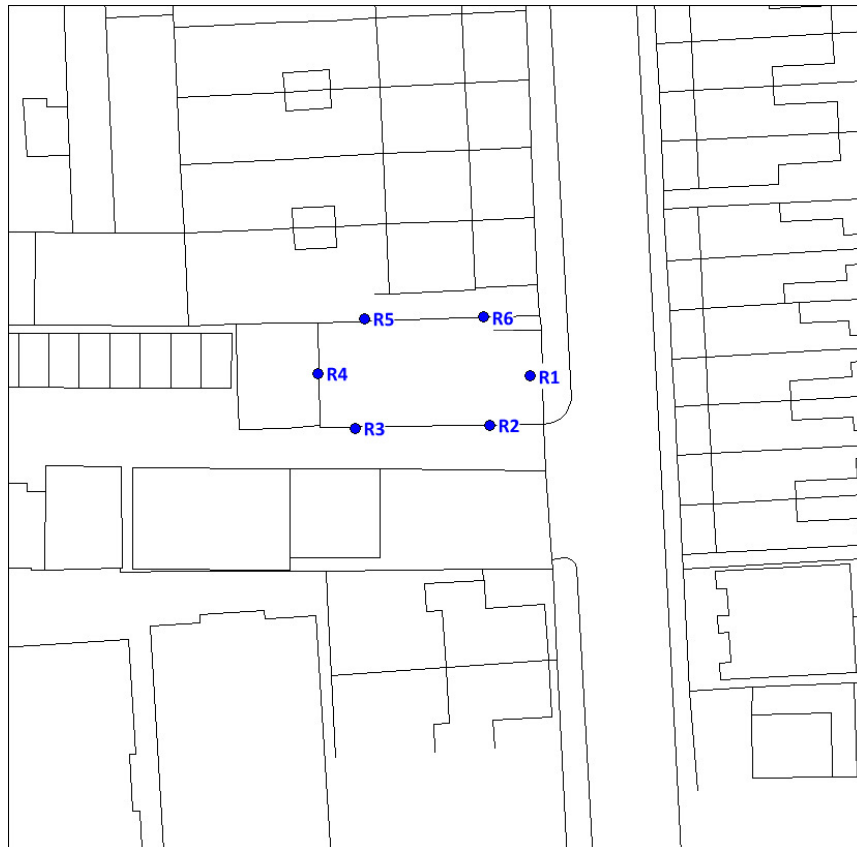
In order to assess the potential impact of the traffic emissions from the local road network, a number of receptors have been identified representing the different facades of the proposed development.

The location of these receptors, together with their height above ground level is provided in Table 6 and represented in Figure 2.

Table 6 – Modelled Receptor Locations

AQA ID	X	Y	Height (m)	Description
R1	505023	183645	1.5 & 4.5	Proposed Ground and First Floors
R2	505019	183640		
R3	505006	183640		
R4	505003	183645		
R5	505007	183650		
R6	505018	183651		

Figure 2 – Modelled Receptor Locations



4.6 Significance Criteria

4.6.1 Operational Phase

The significance of emissions will be determined by comparing the predicted results to the Air Pollution Exposure Criteria (APEC) detailed in the *Air Quality and Planning Guidance* written by the London Air Pollution Planning and the Local Environment (APPLE) working group¹⁸. The Air Pollution Exposure Criteria is considered appropriate to describe the significance of the impacts predicted, together with an indication as to the level of mitigation required in order for the development to be approved. The APEC table is provided below.

Table 7 – Air Pollution Exposure Criteria (APEC)

APEC Category	NO ₂	PM ₁₀	Recommendations
A	>5% below national annual mean objective	>5% below national annual mean objective >1-day less than national 24-hour objective	No air quality grounds for refusal; however mitigation of any emissions should be considered.
B	Between 5% below or above national annual mean objective	Between 5% above or below national annual mean objective Between 1-day above or below national 24-hour objective	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered
C	>5% above national annual mean objective	>5% above national annual mean objective >1-day more than national 24-hour objective	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated

Furthermore, the guidance released by Environmental Protection UK also provides steps for a Local Authority to follow in order to assess the significance of air quality impacts of a development proposal. This procedure, shown in Figure 3, has also been applied to the modelled results.

¹⁸ Air Quality and Planning Guidance, written by the London Air Pollution Planning and the Local Environment (APPLE) working group, January 2007

EFFECT OF DEVELOPMENT:

OUTCOME:

Assemble the air quality impacts (from Air Quality Assessment)

DO THEY

Lead to a breach or significant worsening of a breach of an EU Limit Value; cause a new breach to occur, or introduce new exposure into an exceedance area?

YES

AQ an **overriding** consideration

NO

Lead to a breach or significant worsening of a breach of an AQ Objective, or cause a new AQMA to be declared, or introduce new exposure into an exceedance area⁽²⁾?

YES

AQ a **high priority** consideration

NO

Interfere significantly with or prevent the implementation of actions within an AQ Action Plan?

YES

AQ a **high priority** consideration

NO

Interfere significantly with the implementation of a local AQ Strategy?

YES

AQ a **medium priority** consideration

NO

Lead to a significant increase in emissions, degradation in air quality or increase in exposure, below the level of a breach of an AQ Objective?

YES

AQ a **medium priority** consideration

NO

AQ a **low priority** consideration

Request additional mitigation

YES

Reach decision

NO

Are mitigation measures adequate?

YES

Reach decision

NO

Request additional mitigation

NOTES:

⁽¹⁾ Where the term **significant** is used, it will be based on the professional judgement of the Local Authority officer.

⁽²⁾ This could include the expansion of an existing AQMA or introduction of new exposure to cause a new AQMA to be declared. Where new exposure is introduced, this should be with reference to the exceedance area, and not the AQMA boundary

5 AIR QUALITY ASSESSMENT

5.1 Impact of Vehicle Emissions

5.1.1 Model Verification

Using the guidance provided within the Local Air Quality Management Technical Guidance TG(16), the modelled output has been verified against the monitoring data obtained from the sites listed in Table 5. The following tables provide a summary of the model verification process for NO_x/NO₂ concentrations.

Table 8 – Comparison of Modelled and Monitored NO₂ Concentrations (µg/m³)

Verification Location	Modelled Concentration	Monitored Concentration	Difference [(modelled - monitored)/monitored] x100
HD52	38.0	36.5	4.1%

As described in the Technical Guidance (LAQM.TG16), in order to provide more confidence in the model predictions and the decisions based on these, the majority of results should be within ±25% (ideally ±10%) of the monitored concentrations. Since the modelled concentrations are within ±10% of the monitored concentrations no adjustment is considered necessary.

5.1.2 Nitrogen Dioxide

Predicted annual mean concentrations for NO₂ in 2015 and 2020 are provided in Table 9. As mentioned in Section 4.5.1, NO₂ concentrations have been calculated from the predicted NO_x concentrations using the latest NO_x-NO₂ conversion spreadsheet available from the Air Quality Archive.

Table 9 – Predicted NO₂ Concentrations, Annual Mean (µg/m³)

Receptor ID	2015		2020	
	Ground Floor	1 st Floor	Ground Floor	1 st Floor
R1	27.4	27.4	27.5	27.5
R2	27.4	27.4	27.5	27.5
R3	27.5	27.5	27.5	27.5
R4	27.5	27.5	27.5	27.5
R5	27.5	27.5	27.5	27.5
R6	27.5	27.4	27.5	27.5
Objective	40.0			

The ADMS predictions for annual mean NO₂ concentrations in 2015 and 2020 indicate that the annual mean objective (40 µg/m³) would be achieved at all modelled receptor locations.

Nitrogen dioxide also has an hourly objective of 200 µg/m³ not to be exceeded more than 18 times in one year. However, the hourly mean concentration has not been calculated directly by ADMS Roads. This is as a result of an evaluation of continuous monitoring data from across the UK that revealed that the relationship between the annual mean and hourly mean NO₂ concentrations was very weak. Nonetheless, research undertaken in 2003¹⁹ has indicated that the hourly NO₂ objective is unlikely to be exceeded at a roadside location where the annual mean NO₂ concentration is less than 60 µg/m³. Given that predicted NO₂ concentrations in 2015 and 2020 are below 60 µg/m³ the likelihood of the short-term objective being exceeded is considered low.

¹⁹ Analysis of Relationship between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites, Laxen and Marner, 2003

5.1.3 Particulate Matter

Predicted annual mean concentrations for PM₁₀ in 2015 and 2020 are provided in Table 10.

Table 10 – Predicted PM₁₀ Concentrations, Annual Mean (µg/m³)

Receptor ID	2015		2020	
	Ground Floor	1 st Floor	Ground Floor	1 st Floor
R1	18.3	18.3	18.3	18.3
R2	18.3	18.3	18.3	18.3
R3	18.3	18.3	18.3	18.3
R4	18.3	18.3	18.3	18.3
R5	18.3	18.3	18.3	18.3
R6	18.3	18.3	18.3	18.3
Objective	40.0			

The ADMS predictions for annual mean PM₁₀ concentrations in 2015 and 2020 indicate that the annual mean objective (40 µg/m³) would be achieved at all the modelled receptor locations. In addition, the maximum number of days when PM₁₀ concentrations are more than 50 µg/m³ is 2, less than the 35 exceedences allowed in the regulations.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Impact of Vehicle Emissions

The predicted concentrations of PM₁₀ and NO₂ in all modelled years are below the relevant objectives. Predicted concentrations at all the modelled receptors fall within APEC Category A, which states that there are “no air quality grounds for refusal, however, mitigation of any emissions should be considered”. Overall, using the flow chart presented in Figure 3, air quality is a low priority consideration at the modelled locations in each of the modelled years.

6.1.1 Building Mitigation

Based on the results and discussion above there is no need to consider building mitigation.

6.2 Overall Conclusion

Based on the outcome of this assessment the current proposals are considered acceptable in terms of the potential air quality impacts across the development.