Air Quality Assessment

90 New Street, Huddersfield

Report Ref: AQ2432

March 2024

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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 air quality on a proposed residential development located on the first and second floors at 90 New Street in Huddersfield.

The pollutants modelled as part of this assessment are nitrogen oxides (NOx) and particulate matter (PM_{10} and $PM_{2.5}$)

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 Local Air Quality Management Technical Guidance (TG22)[2]. The impact of road traffic emissions will be assessed using the ADMS-Roads 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 NO_2 and PM_{10} 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, Vol 11, Section 3, Part 1 – HA207/07, Highways Agency, May 2007

[2] Part IV of the Environment Act 1995, Local Air Quality Management Technical Guidance (TG22), Defra, August 2022

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 (NO_2), fine particulates (PM_{10}), carbon monoxide (CO), 1,3-butadiene and benzene, as well as carbon dioxide (CO_2). This air quality assessment focuses on NO_2 and PM_{10}, as these pollutants are least likely to meet their Air Quality Strategy objectives near roads. Table 1 provides an overview of NO_2 and PM_{10}.

Table 1 – Overview of NO_2 and PM_{10}

Pollutant	Properties	Anthropogenic Sources	Natural Sources	Potential Effects
Particles (PM_{10})	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 (NO_2)	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 2007[3]. The Strategy provides an over-arching strategic framework for air quality management in the UK.

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 (PM_{10} and $PM_{2.5}$) have been set, along with 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 (Amendment) Regulations 2016, which came into force on 31st December 2016. Table 2 provides the UK Air Quality Objectives for NO_2 and PM_{10}.

[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

Table 2 – UK Air Quality Objectives for Nitrogen Dioxide and Particulates

Pollutant	Objective	Concentration measured as	Obligation
Particles (PM_{10})	50µg/m^3 not to be exceeded more than 35 times a year	24 hour mean	All local authorities
	50µg/m^3 not to be exceeded more than 7 times a year	24 hour mean	Scotland only
	40µg/m^3	Annual mean	All local authorities
	10µg/m^3	Annual mean	Scotland only
Particles ($PM_{2.5}$)	20µg/m^3 (a)	Annual Mean	England only (encouraged in Wales)
	10µg/m^3	Annual Mean	Scotland only
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1 hour mean	All local authorities
	40µg/m^3	Annual mean	All local authorities

(a) The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 is an amendment to the existing regulations and reduces the threshold for $PM_{2.5}$ from 25 µg/m^3 to 20 µg/m^3.

2.3 Clean Air Strategy

The Clean Air Strategy[4] was published in January 2019 and sets out the comprehensive action that is required from across all parts of government and society to tackle all sources of air pollution. New legislation will create a stronger and more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanisms.

2.4 Local Air Quality Management

At the core of LAQM delivery are three pollutant objectives; these are: nitrogen dioxide (NO_2), particulate matter (PM_{10}) and sulphur dioxide (SO_2). All current Air Quality Management Areas (AQMAs) across the UK are declared for one or more of these pollutants, with NO_2 accounting for the majority. 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.

[4] Clean Air Strategy 2019, Department for Environment, Food and Rural Affairs, January 2019

2.4.1 Kirklees Council

The Council has declared a number of Air Quality Management Area (AQMAs). The "*Kirklees AQMA 9*" incorporates roads bordering and within the Huddersfield Ring Road. The proposed development is located 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 updated National Planning Policy Framework (NPPF) for England, released in July 2021, 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.

Paragraph 105 within the NPPF states that the "*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*".

It goes on to state in paragraph 186 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*".

3.1.2 Planning Practice Guidance (PPG)

The NPPF is supported by the national Planning Practice Guidance (PPG), which includes guiding principles on how planning can take account of the impacts of new development on air quality (updated November 2019). The PPG states that "*Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values*" and "*It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit*". The role of the local authorities is covered by the LAQM regime, with the PPG stating that local authority Air Quality Action Plans "*identify measures that will be introduced in pursuit of the objectives*". The PPG makes clear that "*Odour and dust can also be a planning concern, for example, because of the effect on local amenity*".

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

The PPG sets out the information that may be required in an air quality assessment, making clear that "*Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".* It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that *"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact*".

3.1.3 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 processes[5].

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.

3.2 Local Planning Policy & Guidance

3.2.1 Kirklees Council Local Plan

Policy LP15 "*Residential use in town centres*" within the Councils Local Plan mentions air quality in relation to residential developments within town centres. It states that these developments will be supported subject to "*the protection of the amenity of existing residents and future occupiers of the proposed residential use in accordance with amenity and design policies within the plan, and will in particular consider matters such as privacy, noise and air quality*".

Furthermore, Policy LP51 "*Protection and improvement of local air quality*" relates specifically to air quality and states the following:

[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

"1. Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would have an unacceptable impact on the natural and built environment or to people.

2. Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase must incorporate sustainable mitigation measures that reduce the level of this impact. If sustainable measures cannot be introduced the development will not be permitted.

3. Where the development introduces new receptors into Air Quality Management Areas or Areas of Concern or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable mitigation measures that protect the new receptors from unacceptable levels of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted".

4 ASSESSMENT METHODOLOGY

4.1 Operational Phase (Traffic Emissions)

4.1.1 Modelled Scenarios

Two scenarios have been modelled as part of this assessment. These are as follows:

- **Scenario 1 (2022)** – existing levels of air quality / model verification; and
- **Scenario 2 (2026)** – future impact of traffic emissions on the proposed development i.e. introduction of new exposure.

A future year has been chosen (2026) representing the earliest full year when the development is likely to be completed and occupied.

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 model[6]. 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 12.0.1) which incorporates updated NOx emissions factors and vehicle fleet information[7]. These emission factors have been integrated into the latest ADMS-Roads modelling software.

The Institute for Air Quality Management (IAQM) released a position statement in July 2018 relating to uncertainties in vehicle NOx emissions within air quality assessments. It states the following:

"*It has been known since around 2011 that nitrogen oxides (NOx) emissions from diesel vehicles have not declined as expected despite the introduction of increasingly more stringent European Union (EU) emission limits since the early 1990s. This, together with an increase in numbers of diesel cars and the use of emission control devices that increase the proportion of the nitrogen dioxide (NO_2) in the exhaust NOx, has resulted in annual mean concentrations of NO_2 remaining high, particularly at roadside locations*".

[6] Model Version: 5.0.0.1. Interface Version 5.0.0.5313 (16/03/2020)
[7] https://laqm.defra.gov.uk/wp-content/uploads/2023/12/EFT2023_v12.0.1.xlsb

However, the IAQM position statement has now been withdrawn and the following statement has been published by the IAQM:

"*There is a growing body of evidence to suggest that the latest COPERT vehicle emission factors, which feed into the EFT (v9 and onwards), reflect the real-world NOx emissions more accurately.*

It is judged that an exclusively vehicle emissions-based sensitivity test is no longer necessary.

On this basis, the EFT may be used for future year modelling with greater confidence when considering the per vehicle emission, provided that the assessment is verified against measurements made in the year 2016 or later".

As such, Scenario 2 has been modelled with vehicle emission factors for 2026 derived from the latest Emission Factors Toolkit.

4.1.4 Traffic Data

Baseline flows along the A62 are available from the Department for Transport (DfT)[8]. Baseline (2022) data from the DfT has been projected to 2026. Projection of traffic data has been undertaken using growth factors specific to Kirklees Council, obtained from TEMPro[9]. The projected flow rates are provided in Table 3. It is assumed that the percentage HDV and speed will remain unchanged in future years.

Table 3 – Annual Average Daily Traffic Flows, Percentage HDV and Speeds for Modelled Roads, 2022 and 2026

Link Name	AADT 2022	AADT 2026	HDV (%)	Speed (kph)
A62 Castlegate Northbound	16,382	17,231	3.4%	48
A62 Castlegate Southbound	19,472	20,481	3.0%	48
A62 Queensgate Eastbound	10,344	10,880	3.7%	48
A62 Queensgate Westbound	15,024	15,802	3.6%	48

For the modelled speeds, the figures provided above have been used. However, where a link approaches a junction a speed of 20 kph has been modelled to represent queuing traffic at a junction.

[8] http://www.dft.gov.uk/traffic-counts/
[9] TEMPro (Trip End Model Presentation Program) version 7.2, Department for Transport

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.

4.2 Background Concentrations

Background NOx, NO_2 and PM_{10} concentrations have been obtained from Defra[10]. These 1 km x 1 km grid resolution maps are derived from a base year of 2018 (for NOx, NO_2, PM_{10} and $PM_{2.5}$ only), which are the projected to the relevant years (2022 and 2026). Background concentrations of NOx, NO_2 and PM_{10} derived from Defra are provided in Table 4.

Table 4 – Background NOx, NO_2 and PM Concentrations

Pollutant	X	Y	2022	2026
NO_2	414500	416500	19.3	17.4
NOx			27.9	24.7
PM_{10}			11.9	11.5
$PM_{2.5}$			8.0	7.7

4.3 Surface Roughness

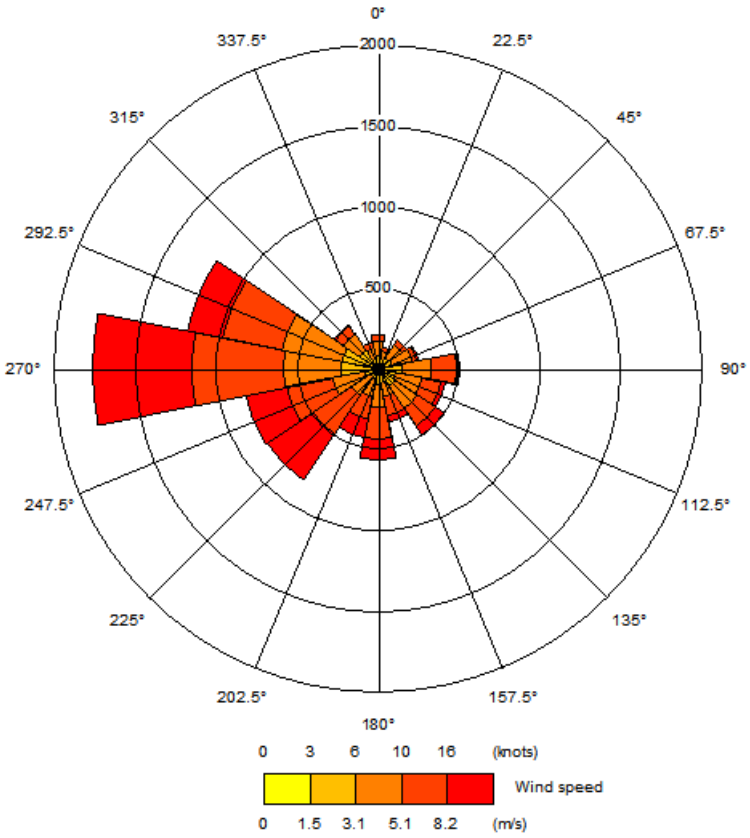
A surface roughness of 1.0 metre has been used in the model. This value is provided by ADMS-Roads as a typical roughness length for a city. This value has been used across the modelled domain.

[10] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

4.4 Meteorological Data

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

Figure 1 – Wind Speed and Direction Data, Emley Moor (2022)



4.5 Model Output

4.5.1 NOx/NO_2 Relationship

The most NOx to NO_2 calculator[11] has been used to determine NO_2 concentrations for this assessment, based on predicted NOx concentrations using ADMS-Roads. Converted NO_2 concentrations are initially compared against local monitoring data to verify the model output. If the model performance is considered unacceptable then the NOx concentrations are adjusted before conversion to NO_2.

4.5.2 Predicted Short Term Concentrations

As discussed in the introduction, it has not been possible to model the short-term impacts of NO_2 and PM_{10}. Research[12] has indicated that the hourly NO_2 objective is unlikely to be exceeded at a roadside location where the annual mean NO_2 concentration is less than 60 µg/m^3. A concentration of 60 µg/m^3 has therefore been used to screen the likelihood of exceedance of the hourly mean NO_2 objective.

For PM_{10}, 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 x annual mean^3 + (206/annual mean)

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

4.5.3 Model Verification

The Council undertakes monitoring of NO_2 along the A62. This is the closest roadside monitoring site to the proposed development. The location of the verification site is provided in Table 5.

Table 5 – Modelled Verification Locations

Site ID	Location	X	Y	Height (m)
K11	Chapel Hill	414359	416277	2.0

[11] https://laqm.defra.gov.uk/documents/NOx_to_NO2_Calculator_v8.1.xlsm
[12] 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

To assess the potential impact of the traffic emissions from the local road network, several 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	Description	Height (m)
1	414376	416379	Proposed First & Second Floor Receptors	5.0 & 8.0
2	414389	416376		
3	414390	416383		
4	414378	416387		

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 group[13]. 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.

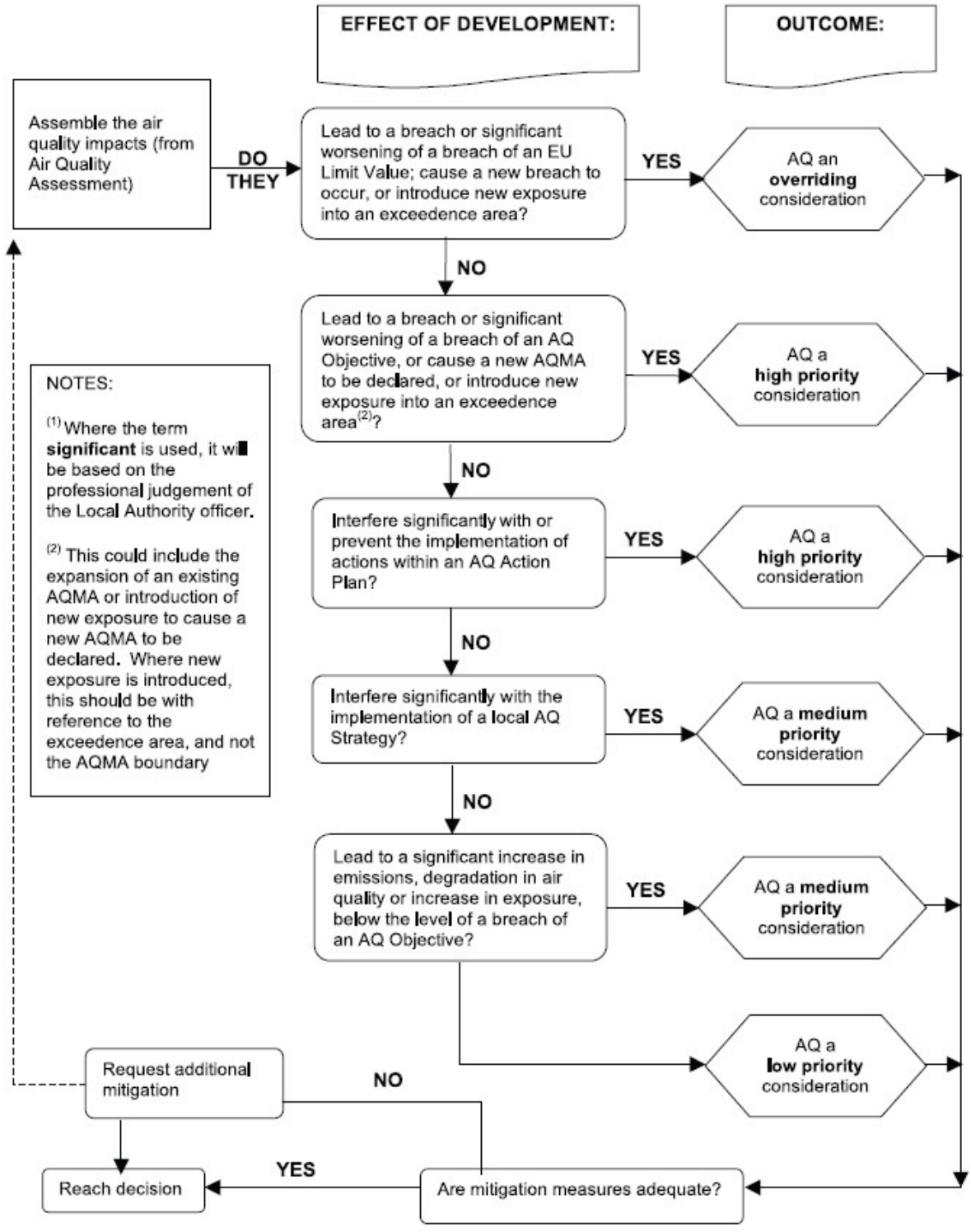
Table 7 – Air Pollution Exposure Criteria (APEC)

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 to assess the significance of air quality impacts of a development proposal. This procedure, shown in Figure 4, has also been applied to the modelled results.

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

Figure 3 – Assessing the Significance of Air Quality Impacts of a Development Proposal



5 Air Quality Assessment

5.1 Impact of Vehicle Emissions

5.1.1 Model Verification

Using the guidance provided in Local Air Quality Management (LAQM) Technical Guidance (TG22), 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 NOx/NO_2 concentrations.

Table 8 – Comparison of Modelled and Monitored NO_2 Concentrations (µg/m^3), 2022

Site ID	Modelled Concentration	Monitored Concentration	Difference [(modelled - monitored)/ monitored] x100
K11	23.1	32.0	-27.8%

As described in the Technical Guidance (TG22), 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. To improve the confidence in modelled concentrations across the modelled domain the model output has been adjusted. This is described further in the next section.

5.1.2 Model Adjustment

To undertake model adjustment, it is first necessary to derive the monitored and modelled road contributions of NOx (excluding background). The modelled road contribution NOx is taken directly from the ADMS-Roads output before it has been converted to NO_2 using the NOx to NO_2 calculator described in Section 4.6.1. The NOx to NO_2 calculator can also be used to derive monitored road contributions of NOx from NO_2 diffusion tube results. A summary of these calculations is provided in Table 9.

Table 9 – Monitored NOx and NO_2 Concentrations

Site ID	Monitored Total NO_2	Defra Background NO_2	Monitored road contribution NO_2 (total – background)	Monitored road contribution NOx (total – background)	Modelled road contribution NOx (excludes background)	Ratio of monitored road contribution NOx / modelled road contribution NOx
K11	32.0	19.3	12.7	25.0	7.2	3.46

Once the monitored and modelled road contributions of NOx (excluding background) have been derived the contributions of NOx are compared and a ratio derived. In this case the ratio is 3.46 and this factor has been used to adjust the modelled road contribution of NOx. This is shown in Table 10.

Table 10 – Adjustment of Modelled NOx Contributions

Site ID	Adjustment factor for modelled road contribution	Adjusted modelled road contribution NOx	Modelled total NO_2 (based on empirical NOx/NO_2 relationship)	Monitored total NO_2	% Difference [(modelled – monitored) / monitored] x 100
K11	3.46	25.0	32.0	32.0	0.0%

Following adjustment of the modelled NOx concentrations by a factor of 3.46 the total NO_2 concentration at the model verification location has been calculated using the method described in Section 4.6.1. The revised NO_2 concentration, shown in Table 10, indicates a more acceptable model performance when compared against the monitored NO_2 concentrations. As such, an adjustment factor of 3.46 has been applied to all modelled NOx concentrations across the model domain before conversion to NO_2.

5.1.3 Nitrogen Dioxide

Predicted annual mean concentrations for NO_2 in 2022 and 2026 are provided in Table 11. As mentioned in Section 4.6.1, NO_2 concentrations have been calculated from the predicted NOx concentrations using the latest NOx-NO_2 conversion spreadsheet available from the Air Quality Archive.

Table 11 – Predicted NO_2 Concentrations, Annual Mean (µg/m^3)

Receptor ID	2022		2026	
	1st Floor	2nd Floor	1st Floor	2nd Floor
1	21.2	21.1	18.7	18.6
2	21.2	21.1	18.7	18.6
3	21.1	21.0	18.6	18.5
4	21.1	21.0	18.6	18.6
Objective	**40.0**			

The ADMS predictions for annual mean NO_2 concentrations in 2022 and 2026 indicate that the annual mean objective (40 µg/m^3) would be achieved at all modelled receptors.

Nitrogen dioxide also has an hourly objective of 200 µg/m^3 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 NO_2 concentrations was very weak. Nonetheless, research undertaken in 2003[14] has indicated that the hourly NO_2 objective is unlikely to be exceeded at a roadside location where the annual mean NO_2 concentration is less than 60 µg/m^3. Given that predicted NO_2 concentrations in 2022 and 2026 are below 60 µg/m^3 the short-term objective for NO_2 is unlikely to be exceeded.

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

5.1.4 Particulate Matter

Predicted annual mean concentrations for PM_{10} in 2022 and 2026 are provided in Table 12.

Table 12 – Predicted PM_{10} Concentrations, Annual Mean (µg/m^3)

Receptor ID	2022		2026	
	1st Floor	2nd Floor	1st Floor	2nd Floor
1	12.0	12.0	11.6	11.6
2	12.0	12.0	11.6	11.6
3	12.0	12.0	11.6	11.6
4	12.0	12.0	11.6	11.6
Objective	**40.0**			

The ADMS predictions for annual mean PM_{10} concentrations in 2022 and 2026 indicate that the annual mean objective (40 µg/m^3) would be achieved at all the modelled receptor locations. In addition, the maximum number of days when PM_{10} concentrations are more than 50 µg/m^3 is 2, less than the 35 exceedences allowed in the regulations.

Predicted annual mean concentrations for $PM_{2.5}$ in 2022 and 2026 are provided in Table 13. The ADMS predictions for annual mean $PM_{2.5}$ concentrations in 2022 and 2026 indicate that the annual mean objective (20 µg/m^3) would be achieved at all the modelled receptor locations.

Table 13 – Predicted $PM_{2.5}$ Concentrations, Annual Mean (µg/m^3)

Receptor ID	2022		2026	
	1st Floor	2nd Floor	1st Floor	2nd Floor
1	8.1	8.1	7.8	7.8
2	8.1	8.1	7.8	7.8
3	8.1	8.1	7.8	7.8
4	8.1	8.1	7.8	7.8
Objective	**20.0**			

6 Conclusions And Recommendations

6.1 Impact of Vehicle Emissions

The predicted concentrations of NO_2 and PM 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, such as mechanical ventilation.

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.