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Air Quality Assessment

Atlas Business Park

Presented to: Aviva Life and Pensions UK Ltd

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Being part of your sustainable supply chain is a key goal for our team. As a member of the UN Global Compact and a commitment to sustainability, we are the partner of choice for businesses looking to make informed decisions and mitigate risks across your portfolio.

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Executive Summary

Site and Report Context	Lucion Delta-Simons Ltd ("Lucion") was instructed by Aviva Life and Pensions limited (the 'Client') to undertake an Air Quality Assessment in support of a planning application for the proposed redevelopment of Atlas Business Park, Simonsway, Manchester. The Site is located in an area where air quality is mainly influenced by road traffic emissions along the local road network and as such, elevated pollutant concentrations may be experienced at this location. Consequently, the Proposed Development has been assessed to determine whether it has the potential to cause adverse impacts to existing pollutant levels at nearby sensitive receptors, as a result of fugitive dust during construction and road vehicle exhaust emissions during operation. Accordingly, an Air Quality Assessment has been prepared to determine baseline conditions in the vicinity of the Site and to assess potential impacts associated with the Proposed Development. The Air Quality Assessment considers ambient pollutant concentrations namely nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$), in the vicinity of the Site. This report presents the findings of the assessment, which addresses the potential air quality impacts during both the construction and operational phases of the Proposed Development. For both phases, the type, source and significance of potential impacts were identified, and the measures that should be employed to minimise these proposed.
Summary	The assessment of construction phase impacts associated with fugitive dust and fine particulate matter of an aerodynamic diameter of less than 10 microns (PM_{10}) emissions has been undertaken in line with the relevant Institute of Air Quality Management (IAQM) guidance. This identified that there is a **medium** risk of dust impacts. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases would be significantly reduced. The residual effects of the construction phase on air quality are considered to be **not significant**. The Proposed Development is expected to result in a **negligible** impact associated with the operational phase traffic on nearby receptors and the residual effects are considered to be **not significant**. A Damage Cost Assessment was undertaken in order to calculate the quantity of potential transport emissions associated with the Proposed Development. The results were used to determine the appropriate level of mitigation required to help avoid, minimise and/ or off-set the impact on air quality.
Conclusions and Recommendations	Based on the results of the assessment and the implementation of the proposed mitigation measures, it is considered that, the Proposed Development complies with national and local planning policies and there are no air quality constraints considered to restrict planning consent.
This is intended as a summary only. Further detail and limitations of the assessment is provided within the main body of the Report.	

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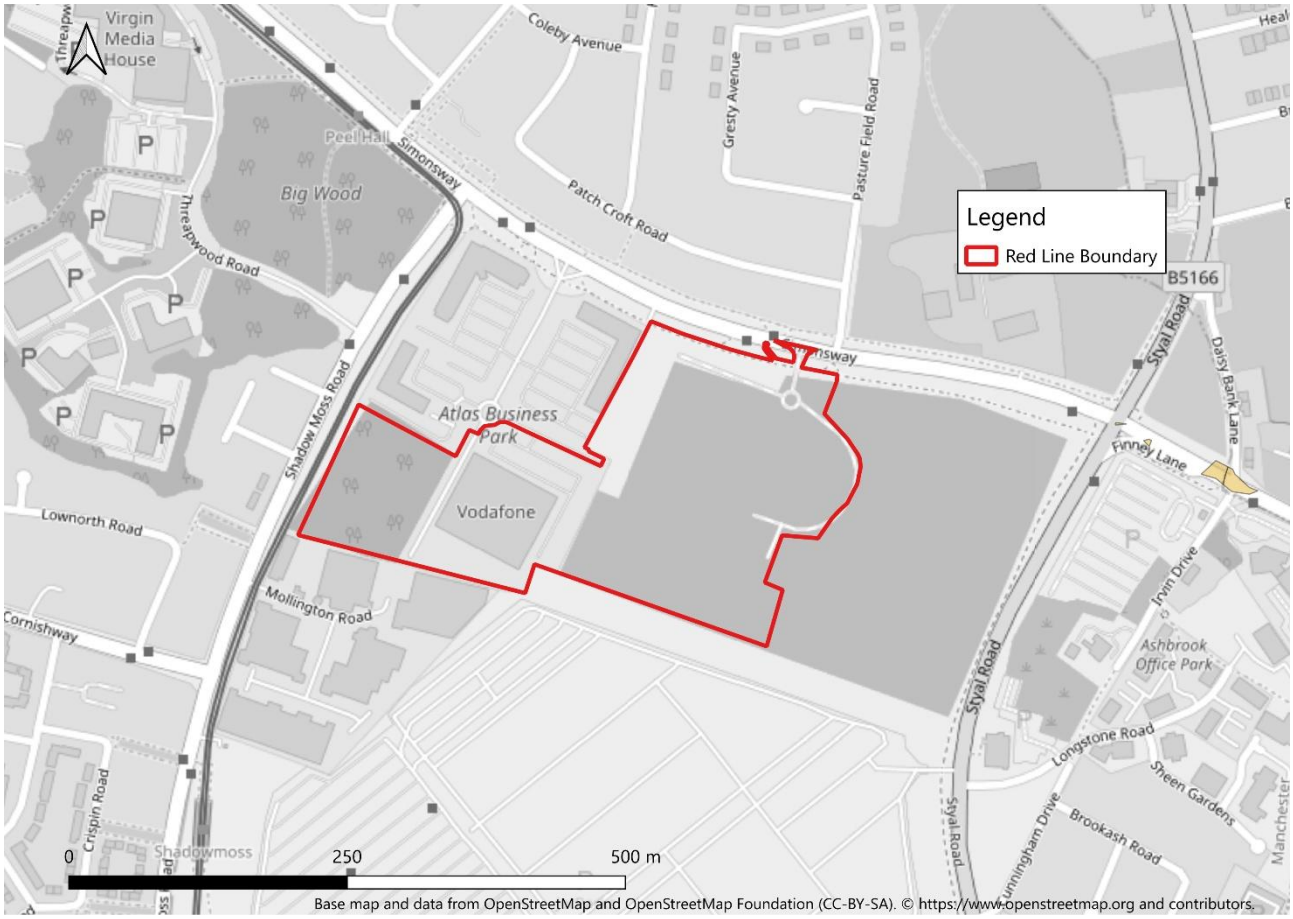
1.0 Introduction

1.1 Appointment

1.1.1 Lucion Delta-Simons Ltd ("Lucion") was instructed by Aviva Life and Pensions UK Ltd (the 'Client') to undertake an Air Quality Assessment in support of and application for full planning permission for the construction of seven units (light industrial (Use Class E(g)(iii), general industrial (Use Class B2) and/or storage or distribution (Use Class B8), together with ancillary offices (Use Class E(g)(i)) providing a total gross external area of 36,706 sqm; and associated service yards, parking, landscaping, amenity space and infrastructure, with vehicular access off Simonsway at Atlas Business Park, Simonsway, Wythenshawe in Manchester, M22 5PR (the 'Site').

1.1.2 Reference should be made to Figure 1 for a map of the Site and surrounding area.

Figure 1 Site Location



1.2 Site Location and Context

1.2.1 The Proposed Development has the potential to cause adverse impacts to existing pollution levels at nearby sensitive receptors as a result of fugitive dust emissions during construction and road vehicle exhaust emissions during operation. As such, an Air Quality Assessment was required to determine baseline conditions at the Site and assess potential impacts associated with the Proposed Development in accordance with the requirements of the National Planning Policy Framework (NPPF) (2026). The Air Quality Assessment will therefore consider ambient pollutant concentrations namely NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) in the vicinity of the Site.

1.2.2 The main potential sources of air pollution were identified as emissions from road transport using the local road network.

1.2.3 The report presents the findings of an assessment of the potential air quality impacts of the Proposed Development during both the construction and operational phases.

1.2.4 For both phases the type, source and significance of potential impacts are identified, and the measures that should be employed to minimise these described.

1.2.5 The standard limitations associated with this assessment are presented in Appendix A.

1.2.6 A glossary of terms used in this report is provided in Appendix B.

2.0 Legislation and Policy

2.1 Air Quality Legislation & Policy

2.1.1 A summary of the relevant air quality legislation and policy is provided below.

Air Quality Strategy (2023)

2.1.2 The Government's policy on air quality within England is set out in the Air Quality Strategy: Framework for Local Authority Delivery (AQS)[1]. The AQS provides a framework for reducing air pollution in England.

2.1.3 The AQS sets standards and objectives for nine key air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3 butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3), and polycyclic aromatic hydrocarbons (PAHs). The standards and objectives for the pollutants considered in this assessment are given in Appendix C.

2.1.4 The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) with regards to current scientific knowledge about the effects of each pollutant on health and the environment.

2.1.5 The air quality objectives are medium-term policy-based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

2.1.6 For the pollutants considered in this assessment, there are both long-term (annual mean) and short-term standards. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road.

2.1.7 Details of where the relevant standards apply are presented in Table 1.

Table 1 Examples of where the AQS Objectives should apply

Averaging Period	Objectives should apply at:	Objectives should generally not 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	Kerbside sites where the public would not be expected to have regular access.

[1] Department for Environment, Food and Rural Affairs (Defra) (2023), Air Quality Strategy: Framework for Local Authority Delivery.

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
	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.	
15-minute mean	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

2.1.8 The AQS contains a framework for considering the effects of a finer group of particles known as '$PM_{2.5}$' as there is increasing evidence that this size of particles can be more closely associated with observed adverse health effects than PM_{10}. Local authorities are required to work towards reducing emissions/concentrations of particulate matter within their administrative area.

Environmental Improvement Plan (2025)

2.1.9 The Environmental Improvement Plan[2] was published in December 2025, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The Concentration Target for 2040 was adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

Air Quality Regulations (2016)

2.1.10 Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000[3] and the Air Quality (England) (Amendment) Regulations 2002[4] for the purpose of Local Air Quality Management (LAQM).

2.1.11 These Regulations require that likely exceedances of the AQS objectives are assessed in relation to:

'[…] the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present […]'

2.1.12 The Air Quality Standards (Amendment) Regulations 2016[5] amends the Air Quality Standards Regulations 2010 that transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as PM_{10}, $PM_{2.5}$ and NO_2.

Environmental Protection Act 1990 - Control of Dust and Particulates Associated with Construction

2.1.13 Section 79 of the Environmental Protection Act 1990 gives the following definitions of statutory nuisance relevant to dust and particles:

'Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance'; and

'Any accumulation or deposit which is prejudicial to health or a nuisance'.

2.1.14 Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

[2] Defra (2025). Environmental Improvement Plan.
[3] The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928.
[4] The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.
[5] The Air Quality Standards (Amendment) Regulations 2016 - Statutory Instrument 2016 No. 1184.

2.1.15 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

Environment Act 2021

2.1.16 Schedule 11 contains amendments of Part IV of the Environment Act 1995[6] (air quality). Local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the AQOs defined in the Regulations. There is a requirement for local authorities to identify relevant sources of emissions that are likely to be responsible for any failure to achieve the AQOs within the area of jurisdiction, or to identify relevant sources within neighbouring authorities and to identify them. Where the objectives are not likely to be achieved, within the relevant period, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

Clean Air Strategy (2019)

2.1.17 In 2019, the UK government released its Clean Air Strategy 2019[7], part of its 25 Year Environment Plan. The Strategy sets out the comprehensive action that is considered to be required from across all parts of government and society.

2.1.18 The focus of air quality management has primarily related to NO_2, and its principal source in the UK, road traffic. The 2019 Strategy aims to broaden the focus to other areas, including actions on clean growth, and emissions from domestic wood burning stoves, industry and agriculture.

Local Air Quality Management (LAQM)

2.1.19 Local Air Quality Management (LAQM), as established under Part IV of the Environment Act 1995 (amended in 2021), places a statutory duty on local authorities to review and assess current and future pollutant concentrations and determine whether they are likely to meet the AQS objectives as determined within the Environment Act for a number of pollutants.

2.1.20 The AQS objectives that apply to LAQM are defined for seven pollutants:

- benzene;
- 1,3-butadiene;
- carbon monoxide;
- lead;
- nitrogen dioxide;
- sulphur dioxide; and
- particulate matter.

2.1.21 Where the results of the annual review process highlight exceedances of the limit values of any of the above, the authority is required to declare an Air Quality Management Area (AQMA).

2.1.22 Where an authority has declared an AQMA, and development is proposed to take place either within or near the declared area, further deterioration to air quality resulting from a proposed development can be a potential barrier to gaining consent for a development proposal. Similarly, where a development would lead to new residents being introduced to an AQMA, the protection of residents against the adverse long-term impacts of exposure to existing poor air quality can provide a barrier to consent.

[6] Environment Act 2021 [Online] Available at: https://www.legislation.gov.uk/ukpga/2021/30/pdfs/ukpga_20210030_en.pdf?timeline=false.

[7] Defra (2019) Clean Air Strategy 2019.

2.2 Planning Policy

2.2.1 A summary of the national and local planning policy relevant to the Proposed Development and air quality is provided below.

National Planning Policy

National Planning Policy Framework (NPPF) (August 2026)

2.2.2 The Government's overall planning policies for England are described in the NPPF for plan making and for making decisions on development proposals in England. In relation to air quality, the following policies in the document are relevant:

P1: Planning for clean and safe places.

To support efforts to avoid and mitigate risks from natural and man-made hazards, minimise levels of pollution and create clean, liveable and safe places for people to live, work and visit, development plans should:

…

iii.. Development proposals will not cause unacceptable levels of pollution, either alone or in combination with other pollution sources, taking into account communities which may be particularly vulnerable to its effects, such as children and older people, as well as habitats and species which may be vulnerable to pollution;

…

b. Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area (such as by identifying opportunities for strategic nature-based solutions);

P3: Living conditions and pollution

Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area (including where certain groups could be particularly vulnerable to its effects, such as children and older people). 2. Within this context development proposals should:

…

c. Sustain and contribute to compliance with relevant limit values or national objectives and targets for air pollutants including PM2.5. Development proposals should take account of Air Quality Management Areas and be consistent with the objectives of relevant Air Quality Action Plans, Clean Air Plans and Local Air Quality Strategies.

Local Planning Policy

Places for Everyone- Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan 2022 – 2039

2.2.3 The Greater Manchester Strategy sets out a vision for the region. Review of the document indicated the following policy of relevance to this assessment:

Policy JP-S5: Clean Air

A comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met, including:

1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;

2. Determining planning applications having regard to the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;

3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air quality can be fully assessed and development only permitted where they are acceptable and/or suitable mitigation can be provided;

4. Restricting developments that would generate significant point source pollution such as some types of industrial activity and energy generation;

5. Significantly expanding the existing commercial network of electric vehicle charging points, both for public and private use, including as part of new developments;

6. Implementing the Clean Air Plan and associated measures;

7. Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;

8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;

9. Controlling traffic and parking within and around schools, early years sites and other locations that are particularly sensitive to air quality;

10. Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and

11. Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users.

2.2.4 The above policy was considered as necessary throughout the undertaking of the assessment.

2.3 Guidance

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

Local Air Quality Management Technical Guidance (May 2025)

2.3.2 The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their review and assessment work[8]. This guidance, referred to in this document as Local Air Quality Management Technical Guidance (LAQM.TG22)[9], has been used where appropriate in the assessment presented herein.

[8] Defra (2022) Part IV of the Environment Act 1995 as amended by the Environment Act 2021 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG22.

[9] Defra (2022) Local Air Quality Management Technical Guidance (TG22).

Land-Use Planning & Development Control: Planning for Air Quality (2017)

2.3.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance[10] 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.

Guidance on the Assessment of Dust from Demolition and Construction V2.2 (2024)

2.3.4 This document[11] 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, PM_{10} impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

National Planning Practice Guidance - Air Quality (2019)

2.3.5 This guidance[12] provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality, it explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. It also provides information on how air quality is taken into account by local authorities in both the wider planning context of Local Plans and neighbourhood planning, and in individual cases where air quality is a consideration in a planning decision.

Interim Planning Guidance for $PM_{2.5}$ (2024)

2.3.6 Interim Planning Guidance[13] on the consideration of the $PM_{2.5}$ targets identified in the Environment Act (2021) in planning decisions has been produced by Defra. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise emissions of $PM_{2.5}$ and its precursors as far as is reasonably practicable be provided in support of planning applications.

Manchester City Council Air Quality & Planning Technical Guidance (August 2022)

2.3.7 The guidance aims to provide help and advice in relation to air quality in a planning context to encourage good practice and mitigation of impacts. It outlines what is expected in relation to current guidance and policy with the aspiration that new developments achieve the highest possible standards without compromising the health and well-being of people that live and work within the City of Manchester.

[10] Environmental Protection UK and IAQM (Version 1.2 Updated January 2017) Land Use Planning & Development Control: Planning for Air Quality.
[11] IAQM (Version 2.2 Updated January 2024). Guidance on the Assessment of Dust from Demolition and Construction.
[12] Department of Communities and Local Government (Updated November 2019) Planning Practice Guidance.
[13] https://uk-air.defra.gov.uk/pm25targets/planning

3.0 Scope & Methodology

3.1 Scope

3.1.1 The scope of the assessment has been determined in the following way:

- Review of Manchester City Council's latest available review and assessment report and air quality data for the area surrounding the Site, including data from the LAQM report and Clean Air Plan available from the Council, Defra[14] and the Environment Agency (EA)[15];
- Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality; and
- Review of the traffic data provided by the Project Transport Consultant (the PTC).

3.1.2 The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

- Dust and particulate matter generated by on-site activities during the construction phase; and,
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational.

3.2 Methodology

Construction Phase

3.2.1 Dust generated during construction is unlikely to cause long-term or widespread changes to local pollutant concentrations. However, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

3.2.2 An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and PM_{10} during the construction phase has been undertaken using: the relevant assessment methodology published by the IAQM; the available information for this phase of the Proposed Development provided by the Client and Project Team; and professional judgement.

3.2.3 The IAQM methodology assesses the risk of potential dust and PM_{10} impacts from the following four sources: demolition, earthworks; general construction activities and track-out.

3.2.4 It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. A summary of the IAQM assessment methodology is provided in Appendix D.

Operational Phase Assessment

3.2.5 Of the pollutants included in the AQS, concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) have been considered in this assessment as road traffic is a major source of these pollutants and their concentrations have the potential to be close to, or in exceedance of, the objectives in urban locations.

[14] Defra Local Air Quality Management (LAQM) Support Pages. Available at: http://laqm.defra.gov.uk/
[15] https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory.

3.2.6 The development has the potential to increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. An assessment was therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[16] guidance to determine the potential for trips generated by the development to affect local air quality.

3.2.7 The following criteria are provided to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

- The development leads to a change of Light Duty Vehicle (LDV) flows of:
  - More than 100 Annual Average Daily Traffic (AADT) within an AQMA;
  - More than 500 AADT outside of an AQMA;
- The development leads to a change of HDV flows of:
  - More than 25 AADT within an AQMA; and
  - More than 100 AADT outside of an AQMA.

3.2.8 Where these thresholds are exceeded, a detailed assessment of air quality is normally required.

3.2.9 In order to predict NO_2 and PM concentrations in the vicinity of the Site, the advanced dispersion model 'ADMS-Roads' has been used. This model uses detailed information regarding traffic flows on the local road network, surface roughness and local meteorological conditions to predict pollutant concentrations. Details of the model input parameters are presented in Appendix E.

Traffic Data

3.2.10 A summary of traffic data and pollutant emission factors used in the assessment can be found in Appendix E. It includes details of the AADT flows, vehicle speeds (km/h) and the percentage of HDVs for the local road network in all assessment years considered. Traffic speeds were reduced at junctions in line with guidance provided in LAQM.TG22, and using professional judgement.

3.2.11 For the assessment, three scenarios were modelled, as follows:

- 2025 - Model Verification;
- 2029 - Anticipated Opening Year Without Development but inclusive of committed development; and
- 2029 - Anticipated Opening Year With Development.

3.2.12 Reference should be made to Figure 2 for a graphical representation of the modelled road link locations.

Vehicle Emission Factors

3.2.13 Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (EFT) (version 14.1), provided on the Defra website . This has been produced by Defra and incorporates COPERT 5.3 vehicle emission factors and fleet information.

Selection of Background Concentrations

3.2.14 Background pollutant data for the operational phase assessment have been taken from the national maps provided on the Defra website , where background concentrations of those pollutants included within the AQS have been mapped at a grid resolution of 1x1km for the whole of the UK. Estimated background concentrations are available for all years between 2021 and 2050. Background concentrations for oxides of nitrogen (NO_x), NO_2, PM_{10} and $PM_{2.5}$ have been utilised in this assessment for the anticipated opening year.

[16] Land-Use Planning & Development Control: Planning for Air Quality, EPUK and IAQM, 2017.

3.2.15 Consideration was given to MAHG but it was considered that this was not representative of the entire modelled area and so has not been used for the purpose of modelling.

Model Verification and Result Processing

3.2.16 The ADMS-Roads dispersion model has been widely validated for this type of assessment and is considered to be fit for purpose. Model validation undertaken by the software developer will not have included validation in the vicinity of the Proposed Development.

3.2.17 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process of verification aims to minimise modelling uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results and was carried out following the methodology specified in Chapter 7, Section 4, of LAQM.TG22.

3.2.18 Details of the verification factor calculations are presented in Appendix E. A factor of 3.68 was obtained during the verification process, indicating that the model was under-predicting. This factor was applied to the modelled road-NOx outputs prior to conversion to annual mean NO2 concentrations utilising the NOx to NO2 Calculator (version 9.1, August 2024) provided by Defra.

3.2.19 Once processed, the predicted concentrations were compared against the relevant AQS objective levels for NO_2, PM_{10} and $PM_{2.5}$ set out in Appendix C.

3.2.20 The air quality modelling generates pollutant estimates of road source contributed NO_x, PM_{10} and $PM_{2.5}$ at specified receptors. To enable comparison with the relevant AQOs for NO_2, PM_{10} and $PM_{2.5}$ it has been necessary to combine the model outputs data with the background concentrations.

3.2.21 To consider compliance with the 1-hour mean AQO for NO_2, Defra's guidance suggests that in locations where the annual mean NO_2 concentration exceeds 60µg/m^3 then the 1-hour mean objective may be exceeded. Where annual mean concentrations are less than 60µg/m$_3$ then exceedance of the 1-hour mean objective is considered unlikely. The risk of non-compliance with the 1-hour mean objective, where up to 18 exceedances of a 1-hour mean concentration of 200µg/m$_3$ are allowed in a calendar year, is therefore considered likely when the annual mean concentration is greater than 60µg/m$_3$ but unlikely when not. This approach has been adopted for this assessment.

3.2.22 To estimate total annual mean concentrations for PM_{10} and $PM_{2.5}$, for comparison with the annual mean AQOs (40 and 20µg/m^3 respectively) the verified model output concentrations are simply added to the background concentrations for these pollutants.

3.2.23 To consider compliance with the 24-hour mean AQO for PM_{10}, Defra's guidance gives the following equation that relates the annual mean concentration to the number of exceedances of the 24 hour mean concentration of 50µg/m$_3$, where up to 35 exceedances are allowed:

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

3.2.24 This approach has been adopted for 24-hour mean PM_{10} for this assessment. The relationship does have limitations in so far that it should not be applied when the annual mean PM_{10} concentration is lower than 14.8µg/m^3 .

3.3 Selection of Sensitive Receptors

3.3.1 Sensitive locations are places where the public or sensitive ecological habitats may be exposed to pollutants resulting from activities associated with the Proposed Development. These will include locations sensitive to an increase in dust deposition and PM_{10} exposure as a result of on-site construction activities, and locations sensitive to exposure to gaseous pollutants emitted from the exhausts of construction and operational traffic associated with the Proposed Development.

Construction Phase

3.3.2 The IAQM assessment is undertaken where there are: human receptors within 250m of the Site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the Site entrance(s); and/or ecological receptors within 50m of the Site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the Site entrance(s). It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors.

Operational Phase

3.3.3 In terms of locations that are sensitive to pollutants emitted from engine exhausts, these will include places where members of the public are likely to be regularly present over the period of time prescribed in the AQS. For instance, on a footpath where exposure will be transient (for the duration of passage along that path) comparison with a short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. At a school or adjacent to a private dwelling, where exposure may be for longer periods, comparison with a long-term standard (such as 24-hour mean or annual mean) may be more appropriate. Table 1 provides examples of the locations where the AQOs should/should not apply.

3.3.4 To complete the assessment of operational phase impacts, a number of 'receptors' representative of locations of relevant public exposure were identified at which pollutant concentrations were predicted. Receptors have been located adjacent to the roads that are likely to experience the greatest change in traffic flows or composition, and therefore NO_2 and PM concentrations, as a result of the Proposed Development.

3.3.5 The locations of the assessment receptors are shown on Figure 2 and listed in

3.3.6 Table 2.

Figure 2 Modelled Receptor Locations

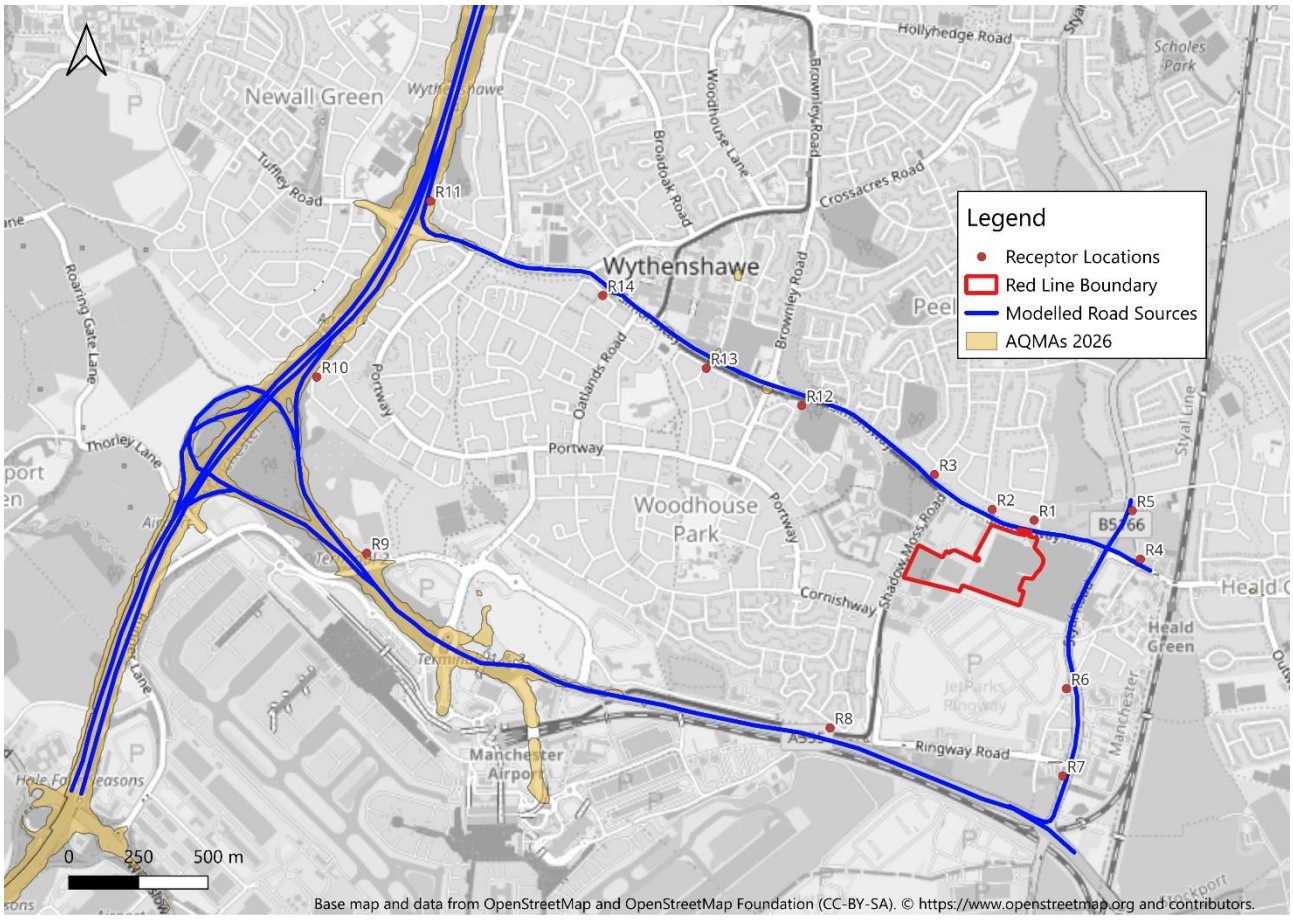


Table 2 - Receptor Locations Used in the Assessment

Receptor	Description / Address	Grid Reference		Height above Ground Level (m)
		X (m)	Y (m)	
R1	Patch Croft Road	384150.1	386457.4	1.5
R2	Patch Croft Road	384212.4	386330.8	1.5
R3	Peel Hall Road	384239.5	386028.8	1.5
R4	Daisy Bank Lane	384411.2	385953.8	1.5
R5	Daisy Bank Lane	384579.5	385916.5	1.5
R6	Trenchard Drive	383992.0	385430.7	1.5
R7	Ringway Road	383843.2	384926.3	1.5
R8	Carsdale Road	383861.2	384791.3	1.5
R9	Ringway	380848.4	386202.3	1.5
R10	Newall Green	381249.4	386576.7	1.5
R11	Newall Green	381220.9	386799.5	1.5
R12	Simonsway	381469.4	386917.2	1.5
R13	Woodhouse Park	381459.4	387097.4	1.5
R14	Woodhouse Park	381220.4	387319.3	1.5

3.4 Significance criteria

Construction Phase

3.4.1 The IAQM assessment methodology recommends that significance criteria is only assigned to the identified risk of dust impacts occurring from a construction activity with appropriate mitigation measures in place. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be **negligible**.

Operational Phase

3.4.2 The approach provided in the EPUK/IAQM guidance has been used within this assessment to assist in describing the air quality effects of additional emissions from traffic generated by the Proposed Development once operational.

3.4.3 This guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion, as summarised in **Table 3**.

3.4.4 The Air Quality Assessment Level (AQAL) is the concentration used for the purpose of assessment. This is typically an Air Quality Objective as defined in Appendix C, though a separate level can sometimes be used (e.g. where a Local Authority has set a lower target than the national objective) and so the terms have slightly different meanings.

Table 3 - Road Vehicle Exhaust Emissions - Significance of Impact

Long Term Average Concentration at Receptors in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

Notes

AQAL = air quality assessment level, which for this assessment related to the UK Air Quality Strategy objectives.

Where the %change in concentrations is <0.5%, the change is described as 'Negligible' regardless of the concentration.

When defining the concentration as a percentage of the AQAL, 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme;' concentration where there is an increase.

Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.

3.4.5 The matrix shown in **Table 3** is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as negligible.

3.4.6 Following the prediction of impacts at discrete receptor locations, the EPUK/IAQM document provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

3.4.7 The EPUK/IAQM guidance states that for most road transport related emissions, long-term average concentrations are the most useful for evaluating the impacts. The guidance does not include criteria for determining the significance of the effect on hourly mean NO_2 concentrations or daily mean PM_{10} concentrations. The significance of effects of hourly mean NO_2 and daily mean PM_{10} concentrations arising from the operational phase have therefore been determined qualitatively using professional judgement and the principles described above.

3.4.8 The EPUK/IAQM guidance says that 'Where the air quality is such that an AQO at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.'

3.4.9 The EPUK/IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. It should be noted that this is a binary judgement of either it is significant, or it is not significant.

4.0 Baseline

4.1 Introduction

4.1.1 Existing air quality conditions in the vicinity of the Site were identified in order to provide a baseline for consideration. These are detailed in the following sections.

4.2 Local Air Quality Management

4.2.1 According to the latest available Air Quality ASR from the Greater Manchester Combined Authority (GMCA) and Defra[17], the Greater Manchester AQMA covers the ten districts of Greater Manchester, including arterial routes, district centres and the airport, and was declared based on the modelled 35µg/m^3 isopleths for annual mean NO_2 concentrations. The Site is located at its closest point approximately 125m west of one section of the Manchester AQMA. As such, potential effects associated with the Proposed Development have been considered at sensitive receptor locations within the AQMA.

4.3 Local Emission Sources

4.3.1 The Site is located in an area where air quality is mainly influenced by emissions from road transport using the adjacent B5166 Styal Road, Simonsway and the local road network.

4.3.2 Aircraft emissions from Manchester Airport are also accounted for through the use of Defra's Background Maps which are inclusion of aviation emissions.

4.4 Air Quality Monitoring

4.4.1 Monitoring of pollutant concentrations is undertaken by the Council throughout its area of jurisdiction utilising continuous and passive methods.

4.4.2 Recent monitoring results recorded in the vicinity of the development are shown in Table 4.

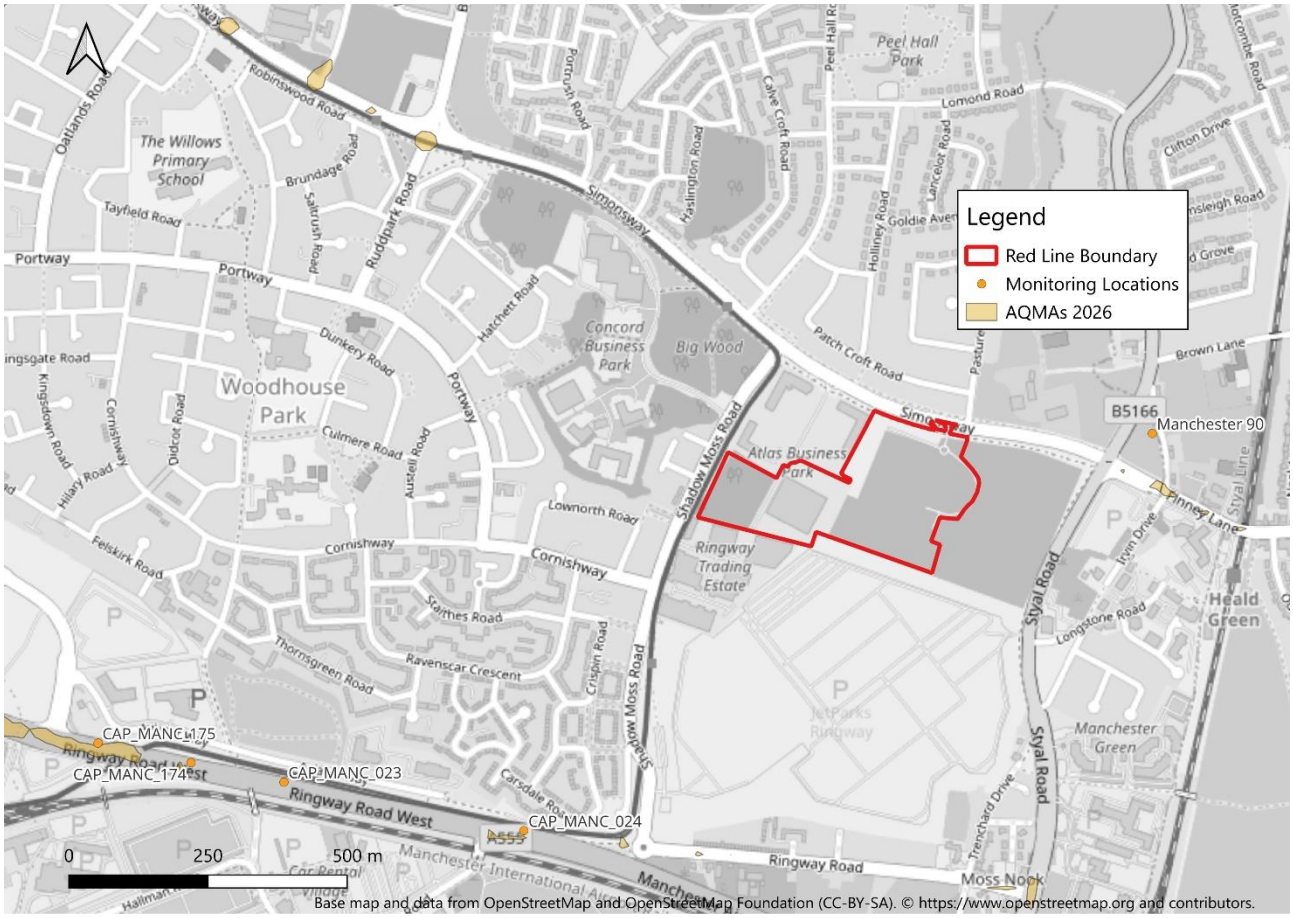
Table 4 – 2025 Monitoring Results

Monitoring Site			Monitored NO_2 Concentration (µg/m^3)	Monitored PM_{10} Concentration (µg/m^3)	Monitored $PM_{2.5}$ Concentration (µg/m^3)
ID	Location	Type			
CAP_MANC_024	Ringway Road W	DT - Roadside	33.9	-	-
CAP_MANC_023	Ringway Road W	DT - Roadside	30.0	-	-
CAP_MANC_174	Ringway Road W	DT - Roadside	30.5	-	-
CAP_MANC_175	Ringway Road W	DT - Roadside	33.8	-	-
Manchester 90	Manchester Sharston (co-located with Automatic Station)	DT - Suburban Background	12.7	-	-
MAHG	Manchester Sharston	Automatic - Suburban Background	14.0	13.0	8.0

[17] Department for Environment, Food and Rural Affairs (Defra) (undated) Local Authority Details Manchester City Council [Online] Available at: https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=155 [Accessed on 05/11/2022].

4.4.3 As shown in Table 4, annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were below the relevant AQOs in 2025. Reference should be made to Figure 3 for a map of the monitoring positions. It should be noted that Manchester 90 and MAHG are co-located.

Figure 3 Air Quality Monitoring Locations



4.5 Background Pollutant Concentrations

4.5.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by Defra for the entire of the UK to assist Local Authorities in their Review and Assessment of air quality. Data for the assessment extents was downloaded from the Defra website[18] for the purpose of the project. This data is summarised in Table 5 below.

Table 5 - Predicted Background Pollutant Concentrations

Site	Year	Pollutant Concentrations (µg/m³)			
		NO_x	NO_2	PM_{10}	$PM_{2.5}$
R1	2025	17.35	12.93	10.70	6.58
R2		17.35	12.93	10.70	6.58
R3		29.60	20.43	11.07	6.76
R4		17.35	12.93	10.70	6.58
R5		17.35	12.93	10.70	6.58
R6		17.35	12.93	10.70	6.58
R7		16.30	12.21	10.22	6.29
R8		23.05	16.54	10.61	6.37

[18] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021.

Site	Year	Pollutant Concentrations (µg/m³)			
		NO_x	NO_2	PM_{10}	$PM_{2.5}$
R9		26.04	18.43	12.92	6.80
R10		19.59	14.46	12.95	6.85
R11		21.60	15.75	13.54	7.18
R12		18.73	13.85	11.48	6.99
R13		18.73	13.85	11.48	6.99
R14		21.60	15.75	13.54	7.18
R1	2029	15.15	11.43	10.46	6.36
R2		15.15	11.43	10.46	6.36
R3		27.54	19.21	10.83	6.53
R4		15.15	11.43	10.46	6.36
R5		15.15	11.43	10.46	6.36
R6		15.15	11.43	10.46	6.36
R7		14.73	11.13	9.96	6.06
R8		21.70	15.68	10.36	6.14
R9		23.22	16.67	12.69	6.58
R10		16.26	12.22	12.72	6.63
R11		18.03	13.40	13.31	6.96
R12		16.35	12.25	11.24	6.76
R13		16.35	12.25	11.24	6.76
R14		18.03	13.40	13.31	6.96

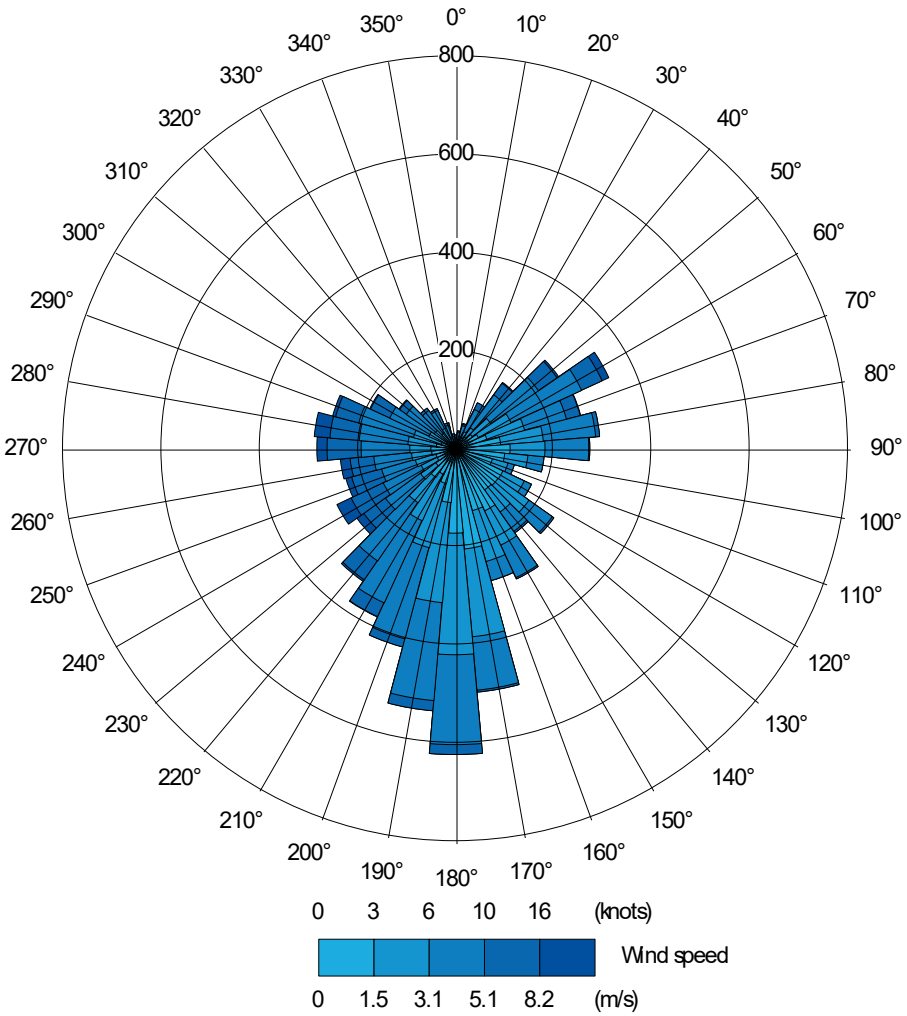
4.5.2 As shown in Table 5, predicted background NO_2 and PM_{10} concentrations are below the relevant AQOs across the assessment extents. Predicted background $PM_{2.5}$ concentrations are below the Concentration Target.

4.6 Meteorological Data

4.6.1 Meteorological data, such as wind speed and direction, are used by the model to determine pollutant transportation and levels of dilution by the wind. Meteorological data used in this assessment were obtained from the observation station at Manchester Airport in 2025.

4.6.2 This station is considered to provide representative data for the assessment. A wind rose generated from the meteorological data used for both the consideration of construction phase impacts and the operational phase dispersion modelling is shown in Figure 4.

Figure 4 Manchester 2025 Wind Rose



5.0 Assessment

5.1 Construction Phase Assessment

Dust and PM_{10} Arising from On-Site Activities

5.1.1 Construction activities that have the potential to generate and/or re-suspend dust and PM_{10} include:

- Preparation of temporary access/egress to the Site and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Movement of vehicles and construction traffic within the Site (including excavators and dumper trucks);
- Use of crushing and screening equipment/plant;
- Exhaust emissions from plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- Construction of buildings, roads and areas of hardstanding alongside fabrication processes;
- Internal and external finishing and refurbishment;
- Trackout, whereby earth is carried from the Site on vehicle tyres, deposited on roads and may later become suspended in the air as a result of vehicle movements; and
- Site landscaping after completion.

5.1.2 The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g. exposed soil produced from significant earthwork activities) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

Assessment of Potential Dust Emission Magnitude

5.1.3 The IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM_{10} sources: demolition; earthworks; construction; and trackout. The findings of the assessment are presented below.

Demolition

5.1.4 There is an existing building on site scheduled for demolition. The approximate volume of this building due for demolition is likely to be between 12,000 and 75,000m^3. As such, the potential dust emission magnitude for demolition activities is considered to be **medium**.

Earthworks

5.1.5 The total area of the Site is approximately 75,000m^2. As such, the potential dust emission magnitude is considered to be **large** for earthwork activities.

Construction

5.1.6 The total volume of buildings to be constructed on the Site is greater than 75,000m^3. As such, the potential dust emission magnitude is considered to be **large** for construction activities.

Trackout

5.1.7 Based on the Site area, it is anticipated that that the unpaved road length may be between 50m and 100m during certain stages of construction with 20-HDV potential outward movements in any one day. It is therefore considered that the potential dust emission magnitude is **medium** for trackout.

5.1.8 **Table 6** provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 6 - Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Medium
Construction	Large
Trackout	Medium

Assessment of Sensitivity of the Study Area

5.1.9 Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. Receptors north of the Site are expected to be affected the most as a result of the prevailing wind direction. It has been assumed that the construction traffic will access the Site through the existing access road.

5.1.10 There are no ecological receptors within 50m of the development boundary or the access route within 250m of the site entrance. As such, ecological impacts have not been assessed further within this report.

5.1.11 Dust soiling sensitivity has been determined as Medium based on ~50 receptors within 100m of the Site as per **Table D. 2**.

5.1.12 Human health sensitivity has been determined to be Low based on background PM_{10} being less than 24 µg/m³ and based on number of receptors around the site per **Table D. 3**.

5.1.13 Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM_{10} has been derived for each of the construction activities considered. The results are shown in **Table 7**.

Table 7 - Sensitivity of the Study Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Low	Low	Low	Low

Risk of Impacts

5.1.14 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. **Table 8** below provides a summary of the risk of dust impacts for the Proposed Development. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 8 - Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Medium Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk

5.1.15 At each risk level, proportionate mitigation measures will be implemented as set out in Section 6.1.

5.2 Operational Phase Assessment

Road Vehicle Exhaust Emission Impacts

5.2.1 Vehicle movements associated with the operation of the Proposed Development will generate exhaust emissions on the local and regional road networks which have the potential to affect existing sensitive receptors. An assessment was, therefore, undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at existing sensitive locations in the vicinity of the Site.

5.2.2 The assessment considered the following three scenarios:

- 2025 - Model Verification;
- 2029 - Anticipated Opening Year Without Development; and
- 2029 - Anticipated Opening Year With Development.

5.2.3 The 2029 scenarios included baseline traffic data, inclusive of anticipated growth for the relevant assessment year through the inclusion of committed traffic from Concord Business Park and Aviator Way, and predicted vehicle trips associated with the operation of the Proposed Development, provided by the PTC.

5.2.4 For the purpose of the assessment, traffic data, emission factors and background concentrations for 2025 and 2029 were used in the dispersion model respectively.

Road Vehicle Exhaust Emission Impacts

5.2.5 Full results of the dispersion modelling are presented in Appendix F and a summary is provided below.

5.2.6 It should be noted that all presented results have been verified in accordance with the methodology outlined within Appendix E.

Nitrogen Dioxide (NO_2)

Annual Mean

5.2.7 Annual mean NO_2 concentrations were predicted to be below the AQO of 40µg/m^3 at all sensitive receptor locations in each of the modelled 2029 scenarios, with no exceedances predicted as a result of the Proposed Development. There were also no exceedances of the 35µg/m^3 GMCA threshold, predicted at sensitive receptor during either the 'Without Development' and 'With Development' scenarios.

5.2.8 In 2029, the anticipated opening year of the Proposed Development, the highest NO_2 concentration of 22.52µg/m^3 was predicted at receptor R3 'Peel Hall Road', in the 'With Development' scenario.

5.2.9 The maximum predicted increase as a result of the Proposed Development was 0.75µg/m^3 at receptor R3 'Peel Hall Road' resulting in a **negligible** impact on annual mean NO_2 concentrations.

5.2.10 Based on the EPUK/IAQM guidance, the impact of the increased emissions associated with the Proposed Development on annual mean NO_2 concentrations is considered to be **negligible**, with the resulting effect considered to be **not significant**.

5.2.11 Based on the extent of predicted population exposure to the impacts on annual mean NO_2 concentrations and the guidance provided by the IAQM, the overall effect of the Proposed Development is considered to be **not significant.**

1-hour Mean

5.2.12 The annual mean NO_2 concentrations predicted by the model were all below 60µg/m^3, and therefore, hourly mean NO_2 concentrations are unlikely to cause a breach of the hourly mean AQS objective. The impact of the Proposed Development on hourly mean NO_2 concentrations at existing sensitive receptors is considered to be **negligible**, with the resulting effect considered to be **not significant**.

Particulate Matter (PM_{10})

Annual Mean

5.2.13 In 2029, Annual mean PM_{10} concentrations were predicted to be well below the AQO of 40µg/m^3 at all existing sensitive receptor locations in each of the modelled 2029 scenarios. The highest PM_{10} concentration of 13.20µg/m^3 was predicted at receptor R7 'Ringway Road' in the 'With Development' scenario.

5.2.14 The maximum predicted increase as a result of the Proposed Development was 0.19µg/m^3 at receptor R3. This resulted in a **negligible** impact on annual mean PM_{10} concentrations.

5.2.15 The predicted changes in annual mean PM_{10} concentrations were all less than <0.5% of the relevant AQO. Based on the EPUK/IAQM guidance, the impact of the increased emissions associated with the Proposed Development on annual mean PM_{10} concentrations is considered to be **negligible**, with the resulting effect considered to be **not significant**.

5.2.16 Based on the extent of predicted population exposure to the impacts on annual mean PM_{10} concentrations and the guidance provided by the IAQM, the overall effect of the Proposed Development is considered to be **not significant**.

24-hour Mean

5.2.17 There has been no predicted increase in the number of days exceeding the daily PM_{10} limit in the 'With Development' scenario, without a risk of exceedance of the AQS objective. As such, the impacts of increased emissions associated with the operational phase of the Proposed Development are **negligible**.

Particulate Matter ($PM_{2.5}$)

Annual Mean

5.2.18 Annual mean $PM_{2.5}$ concentrations were predicted to be well below the AQO of 20µg/m^3 in each of the modelled 2029 scenarios at all existing sensitive receptors. The highest predicted annual mean $PM_{2.5}$ concentration of 9.70µg/m^3 was predicted at receptor in the 'With Development' scenario.

5.2.19 The maximum predicted increase as a result of the Proposed Development was 0.12µg/m^3 at receptor R3, resulting in a **negligible** impact on annual mean $PM_{2.5}$ concentrations from the additional traffic associated with the operation of the Proposed Development.

5.2.20 The predicted changes in annual mean $PM_{2.5}$ concentrations were all less than <0.5% of the relevant AQO. Based on the EPUK/IAQM guidance, the impact of the increased emissions associated with the Proposed Development on annual mean $PM_{2.5}$ concentrations is considered to be **negligible**, with the resulting effect considered to be **not significant**.

5.2.21 Based on the extent of predicted population exposure to the impacts on annual mean $PM_{2.5}$ concentrations and the guidance provided by the IAQM, the overall effect of the Proposed Development is considered to be **not significant**.

Defra Emissions 'Damage' Cost Calculation

5.2.22 A Defra Emissions 'Damage' Cost Calculation was undertaken to assess the local emissions from the Proposed Development and to determine the appropriate level of mitigation (a damage cost value) required to help reduce the potential effect on health and/or the local environment. This was undertaken in accordance with the MCC Air Quality Planning and Technical Guidance and Defra Guidance (2021)[19], utilising the following calculation:

Cost of Road Transport Emission Increase =

∑ [Estimated trip rate for 5 years × Emission rate per 10km per vehicle type × Damage Costs]

5.2.23 The link length was assumed to be 10km in accordance with the MCC Air Quality Planning and Technical Guidance and the average speed was estimated, taking into account congestion on nearby roads.

5.2.24 The inputs to the calculation are detailed in **Table 9**.

Table 9 - Emissions Cost Calculation Inputs

Input	Unit	Value
Trip Rate of Proposed Development	AADT	1,224 AADT (16% HGV)
Link length	km	10
Average speed (km/h)	km/h	48
Emissions year	year	2029
Area / road type		Urban (not London)
Defra cost per tonne per pollutant (road transport urban medium, central estimate)[29]	NOx	£11,630
	PM2.5	£99,639

5.2.25 To obtain the annual emissions, the above inputs were used with the Emissions Factors Toolkit. It should be noted that vehicle emissions are predicted to decrease in future years as there is greater electrification of the fleet.

Table 10 – Emissions Factors Toolkit Outpu

Year	Development vehicle emissions from EFT (Tonnes/year)	
	NO_x	$PM_{2.5}$
2029	0.701	0.120
2030	0.599	0.118
2031	0.515	0.117
2032	0.448	0.115
2033	0.393	0.114

5.2.26 The Emissions Cost Calculation for the Proposed Development is detailed in **Table 11**.

[19] Department for Environment, Food and Rural Affairs (Defra) (2021) Air Quality Appraisal: Damage Cost Guidance [Online] Available at: https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance [Accessed on 05/11/2022].

Table 11 - Emissions Cost Calculation

Emissions Year	Calculated Cost by Pollutant	
	NO_X	$PM_{2.5}$
2029	£8,158.31	£11,998.25
2030	£6,965.63	£11,786.77
2031	£5,994.05	£11,617.43
2032	£5,214.65	£11,486.09
2033	£4,575.66	£11,375.19
Total Cost	**£89,172.04**	

5.2.27 The calculated emissions cost value in Table 11 gives an indication as to the cost of the Proposed Development to local air quality over a 5-year period.

Interim Planning Guidance for $PM_{2.5}$

5.2.28 Interim Planning Guidance[20] on the consideration of the $PM_{2.5}$ targets identified in the Environment Act (2021) in planning decisions has been produced by Defra. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise emissions of $PM_{2.5}$ and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in **Table 12**, along with the development response.

Table 12 - Interim Planning Guidance Questions

Potential Impact	Risk
How has exposure to $PM_{2.5}$ been considered when selecting the development site? Factors to consider include: • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these • Site proximity to pollution sources and the impact of these on users of the development • Exposure and emission during both construction and in-use	The Proposed Development is located in a residential and commercial setting. There are no schools, hospitals or care homes in the vicinity of the site. As summarised in the Operational Phase assessment, impacts associated with the proposals are predicted to be **not significant** The proposals comprise a place of work and is therefore not considered sensitive to long-term pollutant exposure As outlined in Section 6.0 below, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations
What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors and to reduce emissions of $PM_{2.5}$ and its precursors? Factors to consider include: • Site layout • The development's design • Technology used in the construction or	In order to reduce emissions of $PM_{2.5}$ with associated impacts at nearby receptors, the following measures have been included in the proposals: • Provision of Electric Vehicle (EV) charging points to encourage the use of low emission vehicles; and, • Provision of secure cycle storage to encourage

[20] Land-Use Planning & Development Control: Planning for Air Quality, EPUK and IAQM, 2017.

Potential Impact	Risk
installed for use in the development • Construction and future use of the development	the use of sustainable transport modes. Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities

5.2.29 Based on the responses in Table 12, and the results of the assessment, as outlined in Sections 5.0 and 6.0, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of $PM_{2.5}$.

Summary

5.2.30 Based on the extent of predicted population exposure to the impacts on pollutant concentrations and the guidance provided by the IAQM, the overall effect of the Proposed Development is considered to be **not significant**.

5.2.31 Predicted concentrations of all pollutants considered during both assessment scenarios for the operational phase, were below the relevant objectives without the risk of exceedance at sensitive receptor locations.

5.2.32 Based on the assessment results, the Site is considered suitable for the Proposed Development without the implementation of mitigation measures during the operational phase.

6.0 Mitigation and Residual Effects

6.1 Construction Phase

Mitigation

6.1.1 Based on the assessment results, mitigation will be required during the construction phase of the Proposed Development. Recommended mitigation measures are given below.

6.1.2 As the site is classed as medium risk the following mitigation measures are highly recommended:

Communications:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real time PM10 continuous monitoring and/or visual inspections.

Site management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport deliveries which might be using the same strategic road network routes.

Monitoring:

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- If required, agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.

- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel:

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management:

- Avoid bonfires and burning of waste materials.
- Additionally as the site is classed as medium risk the following mitigation measures are desired:

Demolition Specific Measures

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.
- Additionally, as the site is classed as Medium Risk for Demolition the following mitigation measure is desirable:
- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).

Earthworks Specific Measures

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

- Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
- Only remove the cover in small areas during work and not all at once.

Construction Specific Measures

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Trackout specific measures

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

Residual Effects

6.1.3 The residual effects of dust and PM_{10} generated by construction activities following the application of the mitigation measures described above and good site practice is considered to be **not significant**.

6.1.4 The residual effects of emissions to air from construction vehicles and plant on local air quality is considered to be **not** significant.

6.2 Operational Phase

Mitigation

6.2.1 While the predicted changes in operational phase pollutant concentrations are negligible, mitigation measures are recommended as best practice to further reduce emissions and offset potential impacts.

6.2.2 The Manchester's Local Development Framework and the Greater Manchester 'Places for Everyone Joint Development Plan Document - Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan Publication Plan' suggests the inclusion of electric vehicles within new developments.

- *'Facilitate modes of transport that reduce carbon emissions e.g by incorporating charging points for electric vehicles, subject to their appropriate design and location.'*

'5. Significantly expanding the network of electric vehicle charging points, both for public and private use, including as part of new developments; […]'

6.2.3 Furthermore, the Proposed Development is assumed to be classified as a 'Major' development, in accordance with the MCC Air Quality and Planning Technical Guidance. As such, the following mitigation measures are suggested.

'Increasingly, providing electric vehicle charging (EVC) infrastructure is considered an effective measure to mitigate local air quality impacts from road vehicle journeys created by proposed

development. MCC encourages developers or their representatives to demonstrate that consideration of providing EVC infrastructure commensurate with the development's scale and MCC's best practice recommendations has taken place at the planning application stage.'

'Electric Vehicle Charging - MCC Best Practice Recommendations

Electric Vehicle (EV) chargepoints and infrastructure are recommended for the following applications:

[…]

- *Non-residential development with any parking spaces'*

'EV charging recommendations:

[…]

- *Non-residential:*
  - *11 or more parking spaces: minimum 20% EV chargepoints, and cable routes for all staff spaces.*
  - *Charging units dependent on end-use as follows:*
    - *Minimum 7kW*: offices, hotels, nursing homes, sheltered accommodation, industrial units, retail units.;*
    - *Minimum 22kW*: supermarkets etc; and*
    - *Minimum 50kW*: service stations etc.'*

'Examples of contributions to:

- *Car clubs;*
- *Low emission vehicle refuelling infrastructure;*
- *Uptake of low emission vehicles;*
- *Low emission public transport options; and*
- *Cycling and walking infrastructure.*

Measures to offset emissions may also be applied as post assessment mitigation.

6.2.4 As part of the development, the below is proposed:

- Cycle parking provision (90 total) is based on a B2 (office) use to accommodate double the number of cyclists than basing it on the requirements for a B8 use to encourage active travel.
- Car parking provision (362 total) is based on a B8 use as this reduces the amount of car parking required and as such promotes less driving and takes advantage of the great public transport options available, with the tram to the west, rail services to the east (Heald Green) and numerous bus services along the frontage.
- EV charging provision (74 total) is proposed at over 20% as fully active EV from day one.

6.2.5 It is anticipated that the proposed mitigation measures will have the potential to reduce emissions of air pollutants during the operation of the Proposed Development, and to offset the Defra Emissions 'Damage' Cost, calculated in the previous section.

Residual Effects

6.2.6 The residual effects of emissions to air from vehicle movements associated with the operation of the Proposed Development on air quality is considered to be **not significant** for NO_2, PM_{10} and $PM_{2.5}$ according to the EPUK/IAQM assessment criteria.

7.0 Summary and Conclusions

7.1.1 Lucion has been appointed to prepare this Air Quality Assessment for a full planning application for a proposed redevelopment of Atlas Business Park, Simonsway, Wythenshawe in Manchester, M22 5PR.

7.1.2 An assessment of the potential impacts on local air quality from construction activities has been carried out for this phase of the Proposed Development using the IAQM methodology. This identified that there is a **medium** to risk of dust impacts. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and PM_{10} releases would be significantly reduced. The residual effects of dust and PM_{10} generated by construction activities on air quality are therefore considered to be **not significant**.

7.1.3 The Site lies within an area where air quality is mainly influenced by emissions associated with traffic along the local road network. Pollutants considered in this assessment were NO_2 and Particulate Matter (PM_{10} and $PM_{2.5}$).

7.1.4 Potential impacts during the operational phase of the Proposed Development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the Site. These were assessed using detailed dispersion modelling. Based on the results of this modelling, operational phase road traffic exhaust emission impacts are considered to be **negligible** at all assessed receptors.

7.1.5 Based on the assessment significance criteria, the residual effects of the Proposed Development are considered to be **not significant** for all pollutants assessed.

7.1.6 Furthermore, it is considered that the Proposed Development complies with national and local policy for air quality.

7.1.7 Based on the assessment results, air quality issues are not considered a constraint to planning consent.

Appendix A - Limitations

The recommendations contained in this Report represent Lucion's professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Lucion does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Lucion obtained, reviewed and evaluated information in preparing this Report from the Client and others. Lucion's conclusions, opinions and recommendations has been determined using this information. Lucion does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Lucion has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

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Appendix B - Glossary

Term	Definition
AADT Annual Average Daily Traffic	A daily total traffic flow (24hrs), expressed as a mean daily flow across all 365 days of the year.
Adjustment	Application of a correction factor to modelled results to account for uncertainties in the model
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year.
AQMA	Air Quality Management Area.
AQO	Air Quality Objective.
AQS	Air Quality Strategy.
AURN	Automatic Urban and Rural (air quality monitoring) Network, managed by contractors on behalf of Defra.
Defra	Department for Environment, Food and Rural Affairs.
EPUK	Environmental Protection (UK).
EV	Electric Vehicle.
Exceedance	A period of time where the concentrations of a pollutant is greater than the appropriate air quality standard.
HDV/HGV	Heavy Duty Vehicle/Heavy Goods Vehicle.
IAQM	Institute of Air Quality Management.
LAQM	Local Air Quality Management.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.

Term	Definition
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
PTC	Project Transport Consultant
$\mu g/m^3$ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

Appendix C - Relevant UK Air Quality Strategy Objectives

Pollutant	Applies To	Objective	Measured As	Date to be achieved by and maintained thereafter	European Obligations	Date to be achieved by and maintained thereafter
Nitrogen dioxide (NO_2)	UK	40µg/m^3	annual mean	31.12.2005	40µg/m^3	01.01.2010
	UK	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005	200µg/m^3 not to be exceeded more than 18 times a year	01.01.2010
Particulate Matter (PM_{10}) (gravimetric)[A]	UK (except Scotland)	40µg/m^3	annual mean	31.12.2005	40µg/m^3	01.01.2010
	UK (except Scotland)	50µg/m^3 not to be exceeded more than 35 times a year	24-hour mean	31.12.2004	50µg/m^3 not to be exceeded more than 35 times a year	01.01.2005
Particulate Matter ($PM_{2.5}$)	UK (except Scotland)	20µg/m^3	annual mean	2020	Particulate Matter ($PM_{2.5}$)	UK (except Scotland)
	England	10µg/m^{3*} Interim Target	annual mean	2030		Note that this is an interim target and not a statutory binding objective
	England	Target of 35% reduction in population exposure compared with the average population exposure baseline period (2016 – 2018)	Population exposure reduction	31st December 2040		
	England	10µg/m^{3*a} not to be exceeded at any relevant monitoring station	annual mean	31st December 2040		

[A] Measured using the European gravimetric transfer sampler or equivalent

$\mu g/m^3$ = microgram per cubic metre

*Target – not legally binding

Appendix D - IAQM Construction Assessment Methodology

Step 1 - Screening the Need for a Detailed Assessment

An assessment will normally be required where there are:

- 'human receptors' within 250m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s); and/or
- 'ecological receptors' within 50m of the site boundary; or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible'.

Step 2a - Define the Potential Dust Emission Magnitude

The following are examples of how the potential dust emission magnitude for different activities can be defined. (Note that not all the criteria need to be met for a particular class). Other criteria may be used if justified in the assessment.

Table D. 1 - Examples of Potential Dust Emission Magnitude

Magnitude	Activity	Criteria
Large	Demolition	>75,000m^3 building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >12m above ground level
	Earthworks	Total site area greater than 110,000m^2 Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 6m in height
	Construction	Total building volume greater than >75,000m^3 On-site concrete batching Sandblasting
	Trackout	More than 50 Heavy Duty Vehicle (HDV) trips per day Potentially dusty surface material (e.g. high clay content) Unpaved road length greater than 100m
Medium	Demolition	12,000m^3 - 75,000m^3 building demolished, dusty material (e.g. concrete) 6-12m above ground level
	Earthworks	Total site area 18,000m^2 to 110,000m^2; Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 3m to 6m in height
	Construction	Total building volume 12,000m^3 to 75,000m^3 Potentially dusty construction material (e.g. concrete) On-site concrete batching
	Trackout	20 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Demolition	<12,000m^3 building demolished, non-dusty material (e.g. metal cladding), <6m

Magnitude	Activity	Criteria
		above ground level, work during wetter months
	Earthworks	Total site area less than <18,000m^2; Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than <3m in height
	Construction	Total building volume less than <12,000m^3 Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	Less than 20 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

Step 2b - Define the Sensitivity of the Area

The tables below present the IAQM assessment methodology to determine the sensitivity of the area to dust soiling, human health and ecological impacts respectively. The IAQM guidance provides guidance to allow the sensitivity of individual receptors to dust soiling and health effects to assist in the assessment of the overall sensitivity of the study area.

Table D. 2 - Sensitivity of the Area to Dust Soiling Effects

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table D. 3 - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentrations (µg/m^3)	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentrations ($\mu g/m^3$)	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
Medium	>32	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table D. 4 - Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2c - Define the Risk of Impacts

The dust emissions magnitude determined at Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts without mitigation applied. For those cases where the risk category is 'negligible' no mitigation measures beyond those required by legislation will be required.

Table D. 5 - Risk of Dust Impacts

Sensitivity of Surrounding Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks, Construction and Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Step 3 - Site Specific Mitigation

Having determined the risk categories for each of the four activities it is possible to determine the site-specific measures to be adopted. These measures will be related to whether the site is considered to be a low, medium or high risk site. The IAQM guidance details the mitigation measures required for high, medium and low risk sites as determined in Step 2C.

Step 4 - Determine Significant Effects

Once the risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction phase. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

Appendix E - Dispersion Model Details

Traffic Flow Data

2025 is the most recent year for which monitoring data and meteorological data are available to enable verification of the model results, and so this year has been used as the baseline year for this assessment. 2029 is the anticipated opening year of the Proposed Development.

Baseline traffic data for use in the assessment, including 24-hour AADT flows and fleet composition as HDV proportion, were obtained from the PTC where applicable.

The baseline traffic data obtained from the PTC was for 2026. This was converted to 2025 data using a factor obtained from TEMPro (version 8.1). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

Table E. 1 Modelled Traffic Data

Road ID	Description	2025 Baseline		2029 Without Development		2029 With Development	
		AADT	HGV %	AADT	HGV %	AADT	HGV %
i	Simonsway (adj Atlas Park)	13,598	1.33	14,586	1.41	15,810	2.54
ii	Simonsway (east of M56)	23,732	1.46	24,392	1.53	24,769	1.51
iii	Styal Road (north of Simonsway)	14,025	0.66	14,288	0.66	14,377	0.65
iv	Styal Road (south of Simonsway)	18,494	0.94	19,046	0.92	19,386	1.92
v	Finney Lane	16,416	1.29	16,985	1.40	17,324	1.37
vi	A555 east of Styal Road	46,500	3.24	47,161	3.23	47,279	3.37
vii	Airport Relief Road (east of Outwood Lane)	23,444	1.38	24,610	1.53	24,705	2.04
viii	Airport Relief Road (West of Outwood Lane)	48,583	4.49	50,030	4.51	50,125	4.75
ix	Finney Lane	168,727	4.53	171,009	4.52	171,253	4.54
x	M56 (North of Airport Relief Road)	146,054	5.11	148,134	5.11	148,176	5.13
xi	M56 (South of Airport Relief Road)	150,812	5.39	152,961	5.39	153,013	5.45

Roughness Length

The roughness length (z_0) is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1m was used to describe the modelling extents and 1m for the meteorological station site. These values of z_0 are considered appropriate for the morphology of these areas and are suggested within ADMS-Roads as being suitable for 'cities, woodlands' and 'agricultural areas (min)', respectively.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum

Monin-Obukhov length of 30m was used to describe the modelling extents and a length of 30m for the meteorological station site. These values are considered appropriate for the nature of these areas and are suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Model Verification

The comparison of modelled concentrations with local monitored concentrations is a process termed 'verification'. Model verification investigates the discrepancies between modelled and measured concentrations, which can arise due to the presence of inaccuracies and/or uncertainties in model input data, modelling and monitoring data assumptions. The following are examples of potential causes of such discrepancy:

- Estimates of background pollutant concentrations;
- Meteorological data uncertainties;
- Traffic data uncertainties;
- Model input parameters, such as 'roughness length'; and
- Overall limitations of the dispersion model.

Nitrogen Dioxide (NO_2)

Most NO_2 is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of the primary pollutant emissions of nitrogen oxides (NO_x = NO + NO_2), in line with the guidance provided within LAQM.TG22.

The model has been run to predict the 2025 annual mean road-NO_x contribution at three roadside diffusion tubes and at one automatic monitor, within the modelled road network at the verification locations with suitable monitoring data and traffic data for the 2025 verification year. The model outputs of road-NO_x have been compared with the 'measured' road-NO_x, which was determined from the NO_2 concentration measured using the diffusion tubes at the monitoring locations, utilising the NO_x to NO_2 Calculator provided by Defra and the NO_2 background concentration (from the Defra background map). As discussed in the methodology section, the most recent suitable data available for model verification purposes is 2025 data.

Table E4 - Model Verification

Site ID	2025 Monitored Total NO_2 ($\mu g/m^3$)	2025 Background NO_2 ($\mu g/m^3$)	2025 Monitored Road Contribution NO_X ($\mu g/m^3$)	2025 Modelled Road Contribution NO_X ($\mu g/m^3$)	Ratio
CAP_MANC_024	33.9	12.9	52.32	10.3	5.10
CAP_MANC_023	30.0	20.4	22.84	6.6	3.44
CAP_MANC_174	30.5	20.4	24.14	9.1	2.66
CAP_MANC_175	33.8	20.4	33.08	10.4	3.18

The road-NO_x adjustment factor was determined as the slope of the best fit line between the 'measured' road contribution and the model derived road contribution, forced through zero (**Figure E1**). This resulted in a factor of **3.68**, indicating that the model was under-predicting. This factor was applied to the modelled road-NO_x concentration for each monitoring site to provide adjusted modelled road-NO_x concentrations. The total NO_2 concentration was then determined by inputting the adjusted modelled road-NO_x concentration and the background NO_2 concentration into the NO_x to NO_2 Calculator.

Particulate Matter (PM_{10} and $PM_{2.5}$)

The local PM_{10} and $PM_{2.5}$ modelling was from a background site. In accordance with LAQM TG(22), only roadside sites should be used for the purpose of model verification. Consequently, the verification factor determined above for adjusting the road-NO_x contribution has been applied to the predicted road -PM contributions, consistent with guidance set out in LAQM.TG22.

Model Performance

An evaluation of model performance has been undertaken to establish confidence in model results. LAQM.TG22 identifies a number of statistical procedures that are appropriate to evaluate model performance and assess the uncertainty. These include:

a) Root mean square error (RMSE);

b) Fractional bias (FB); and

c) Correlation coefficient (CC).

These parameters estimate how the model results agree or diverge from the observations. These calculations can be carried out prior to, and after adjustment, or based on different options for adjustment, and can provide useful information on model improvement. Further details can be found in Box 7-17 of LAQM.TG22.

Table E5 - Methods for Describing Model Uncertainty

Statistical Parameter	Comments	Modelled Value
RMSE	RMSE is used to define the average error or uncertainty of the model. The units of RMSE are the same as the quantities compared. If the RMSE values are higher than 25% of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. For example, if the model predictions are for the annual mean NO_2 objective of 40µg/m^3, if an RMSE of 10µg/m^3 or above is determined for a model it is advised to revisit the model parameters and model verification. Ideally an RMSE within 10% (10% of 40 = 4µg/m^3) of the air quality objective would be derived. I.e. if the value is less than 4µg/m^3 the model can be considered to be representative of on site conditions.	3.20
Fractional Bias	It is used to identify if the model shows a systematic tendency to over or under predict. FB values vary between +2 and -2 and has an ideal value of zero. Negative values suggest a model over-prediction and positive values suggest a model under-prediction.	-0.01
Correlation Coefficient	It is used to measure the linear relationship between predicted and observed data. A value of zero means no relationship and a value of 1 means absolute relationship. This statistic can be particularly useful when comparing a large number of model and observed data points.	0.02

To assess the uncertainty of a model, the RMSE is the simplest parameter to calculate providing an estimate of the average error of the model in the same units as the modelled predictions. It is also often easier to interpret the RMSE than the other statistical parameters and therefore it has been calculated in this assessment to understand the model uncertainty.

The overall weighted RMSE value calculated after verification was below 10% and, therefore, the final predictions are considered to be acceptable.

LAQM TG(22) states the following:

If your checks confirm that:

- *there is no systematic under or over prediction;*
- *predictions at sites where monitoring shows concentrations are close to the objective show good comparison; and*
- *the majority of results are within 25% (as a minimum - preferably within 10%) of monitored concentrations.*

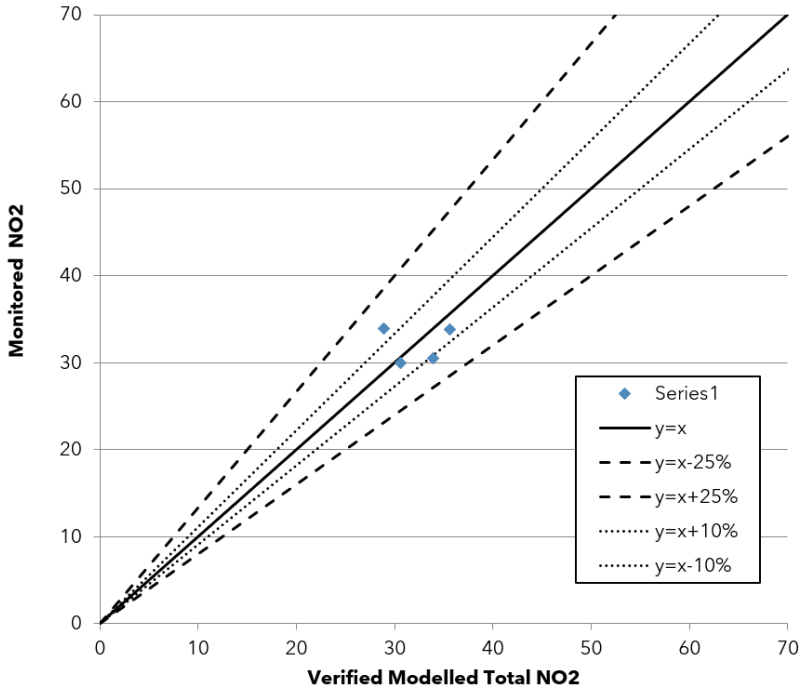
Then you do not necessarily need to adjust your modelling results. However, you may consider model adjustment as this can lead to further improvements in the results obtained, for example where all results move to within 10% of monitored concentrations.

The variation between the modelled and monitored results are shown below.

Table E. 2 Comparison of Modelled and Monitored Results

Modelled Total NO2 (µg/m³)	Monitored Total NO_2 (µg/m³)	NO_2 % Difference	NO_2 Difference (Modelled - Monitored) (µg/m³)
28.85	33.90	-14.90	-5.05
30.62	30.00	2.07	0.62
33.92	30.50	11.21	3.42
35.63	33.80	5.41	1.83

Figure E. 1 Comparison of Modelled and Monitored NO_2



As shown, all results are within 25% with two being within 10%. The model is therefore considered to be suitable to use for assessment.

Appendix F – Detailed Modelling Results

Table F. 1 Modelled NO_2 Results

Receptor	Baseline Year Concentration (µg/m³)	Future Without Dev. (µg/m³)	Future With Dev. (µg/m³)	% of AQAL	Change (µg/m³)	% of AQO	Impact
R1	16.90	13.88	14.09	35.23	0.21	0.52	Negligible
R2	17.55	14.30	14.58	36.45	0.28	0.70	Negligible
R3	25.26	22.22	22.52	56.30	0.30	0.75	Negligible
R4	20.84	16.24	16.33	40.83	0.09	0.23	Negligible
R5	18.84	14.92	14.96	37.40	0.04	0.10	Negligible
R6	17.43	14.14	14.18	35.45	0.04	0.10	Negligible
R7	22.22	17.25	17.34	43.35	0.09	0.23	Negligible
R8	22.68	19.38	19.47	48.68	0.09	0.23	Negligible
R9	25.27	20.70	20.71	51.78	0.01	0.03	Negligible
R10	32.95	23.32	23.32	58.30	0.00	0.00	Negligible
R11	38.23	27.22	27.25	68.13	0.03	0.08	Negligible
R12	16.93	14.09	14.21	35.53	0.12	0.30	Negligible
R13	17.26	14.27	14.34	35.85	0.07	0.18	Negligible
R14	20.14	16.03	16.05	40.13	0.02	0.05	Negligible

Table F. 2 Modelled PM_{10} Results

Receptor	Baseline Year Concentration (µg/m³)	Future Without Dev. (µg/m³)	Future With Dev. (µg/m³)	% of AQAL	Change (µg/m³)	% of AQO	Impact
R1	11.95	11.69	11.81	29.53	0.12	0.31	Negligible
R2	12.19	11.93	12.09	30.23	0.16	0.40	Negligible
R3	12.73	12.48	12.67	31.67	0.19	0.46	Negligible
R4	12.87	12.54	12.58	31.46	0.05	0.11	Negligible
R5	12.31	11.96	11.98	29.96	0.02	0.05	Negligible
R6	12.15	11.84	11.86	29.66	0.02	0.06	Negligible
R7	13.55	13.15	13.20	33.01	0.05	0.13	Negligible
R8	12.32	12.00	12.04	30.09	0.03	0.08	Negligible
R9	14.72	14.40	14.41	36.03	0.01	0.02	Negligible
R10	16.59	16.05	16.06	40.16	0.01	0.03	Negligible
R11	18.21	17.61	17.63	44.07	0.02	0.06	Negligible
R12	12.30	12.04	12.09	30.23	0.06	0.14	Negligible
R13	12.40	12.12	12.15	30.38	0.03	0.07	Negligible
R14	14.82	14.53	14.55	36.36	0.02	0.04	Negligible

Table F. 3 Modelled $PM_{2.5}$ Results

Receptor	Baseline Year Concentration (µg/m³	Future Without Dev. (µg/m³)	Future With Dev. (µg/m³)	% of AQAL	Change (µg/m³)	% of AQO	Impact
R1	7.40	7.15	7.23	36.13	0.08	0.39	Negligible
R2	7.55	7.30	7.41	37.03	0.10	0.51	Negligible
R3	7.84	7.60	7.71	38.56	0.12	0.59	Negligible
R4	8.01	7.70	7.73	38.63	0.03	0.15	Negligible
R5	7.64	7.33	7.34	36.70	0.01	0.07	Negligible
R6	7.53	7.24	7.26	36.29	0.02	0.08	Negligible
R7	8.47	8.11	8.14	40.71	0.03	0.17	Negligible
R8	7.49	7.20	7.22	36.10	0.02	0.11	Negligible
R9	7.98	7.67	7.68	38.39	0.01	0.03	Negligible
R10	9.24	8.74	8.75	43.75	0.01	0.03	Negligible
R11	10.25	9.68	9.70	48.48	0.02	0.08	Negligible
R12	7.53	7.27	7.31	36.53	0.04	0.18	Negligible
R13	7.59	7.33	7.34	36.72	0.02	0.09	Negligible
R14	8.02	7.74	7.75	38.75	0.01	0.05	Negligible