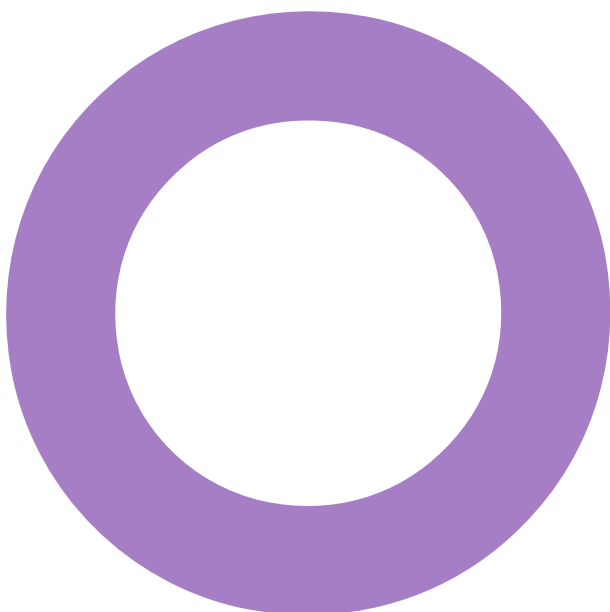


Albert Bridge House. Manchester. Oval Real Estate.

AIR QUALITY
AIR QUALITY ASSESSMENT

REVISION 01 – 06 OCTOBER 2022



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	14/09/2022	First Draft	PS / AJ	AD	CR
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Executive Summary.

Hoare Lea have been commissioned by Oval Real Estate to undertake an Air Quality Assessment to support the planning application for the proposed mixed-use development on Bridge Street, in Manchester, M60 9AF (hereafter referred to as the 'Application Site').

The proposals comprise the demolition of the existing building complex and the construction of a mixed use development comprising an office building of up to 19 storeys, (Class E(g(ii)) with ground floor commercial, leisure, food and drink uses (Use Class E (a), (b), (c) and/ or drinking establishment Sui Generis) and, a residential building up to 45 storeys (Use Class C3) with basement car parking, cycle parking, landscaping and public realm, servicing and access arrangements, highway alterations and other associated works (hereafter referred to as the 'Proposed Development').

A site suitability assessment has been undertaken to assess the suitability of the Application Site for the Proposed Development. The modelling assessment of concentrations at proposed receptors at the façade of the Proposed Development on multiple floors representing the worst-case MVHR intake locations has shown that there are no predicted exceedances of the NO₂ annual mean AQO. There are not expected to be any exceedances at the façade of the Proposed Development of the 1-hour mean NO₂, 24-hour mean PM₁₀ or the annual mean PM₁₀ and PM_{2.5} AQOs and therefore no mitigation is required and windows can be openable.

The traffic generated by the Proposed Development as supplied by Curtins the project transport consultants is anticipated to be below the criteria set-out in the Environmental Protection United Kingdom (EPUK) and Institute of Air Quality Management (IAQM) planning guidance and consequently the impact of additional traffic on local air quality is considered insignificant and a detailed assessment is not required.

The energy strategy for the Proposed Development is to be all electric, utilising zero emissions technologies in the form of Air Source Heat Pumps (ASHP) with backup generators for life-safety purposes only and with limited testing (less than 18 hours a year). Therefore, there will not be an impact on air quality from combustion emissions from internal sources during normal operation.

The impacts of demolition and construction work on dust soiling and ambient fine particulate matter concentrations have been assessed. This has identified that there is a high risk of dust emissions from on-site activity during the construction phase of the Proposed Development. Thus, appropriate mitigation measures for high risk developments have been identified. Provided these are implemented and included within a dust management plan, for example through a planning condition, the residual impacts are considered to be not significant.

Based on the assessment results, the Application Site is considered suitable for the Proposed Development without the inclusion of mitigation in the operational phase. Therefore, air quality should not be considered as a constraint to the planning consent and the Proposed Development conforms to the principles of the National Planning Policy Framework and the Manchester City Council Local Plan.

1. Introduction.

Hoare Lea have been commissioned by Oval Real Estate to undertake an Air Quality Assessment to support the planning application for the proposed mixed-use development on Bridge Street, in Manchester, M60 9AF (hereafter referred to as the 'Application Site').

1.1 Proposed Development.

The proposals comprise the demolition of the existing building complex and the construction of a mixed use development comprising an office building of up to 19 storeys, (Class E(g(ii)) with ground floor commercial, leisure, food and drink uses (Use Class E (a), (b), (c) and/ or drinking establishment Sui Generis) and, a residential building up to 45 storeys (Use Class C3) with basement car parking, cycle parking, landscaping and public realm, servicing and access arrangements, highway alterations and other associated works (hereafter referred to as the 'Proposed Development').

The energy strategy for the Proposed Development is to be all electric, utilising zero emissions technologies in the form of Air Source Heat Pumps (ASHP) with generators for life-safety purposes only. Therefore, there will not be an impact on air quality from combustion emissions during normal operation.

The ventilation for the Proposed Development will utilise on-floor Mechanical Ventilation with Heat Recovery (MVHR) in the office and in each individual apartment to provide air supply and extraction, along with heat recovery.

1.2 Application Site Description and Location.

The Application Site is located within Manchester City Council (MCC) administrative area at the approximate National Grid Reference (NGR): X 383430, Y 398380.

The Application Site is currently occupied by Albert Bridge House and two car parks. Albert Bridge House includes three parts, a 17-storey building, flanked by a five and two storey building. Albert Bridge House is currently vacant. The River Irwell lies immediately to the north of the Application Site with Bridge Street to the south and St Mary's Parsonage to the east. Trinity Bridge lies in close proximity to the north-eastern corner of the Site and crosses the River Irwell. The location of the Application Site is shown in Figure 1.

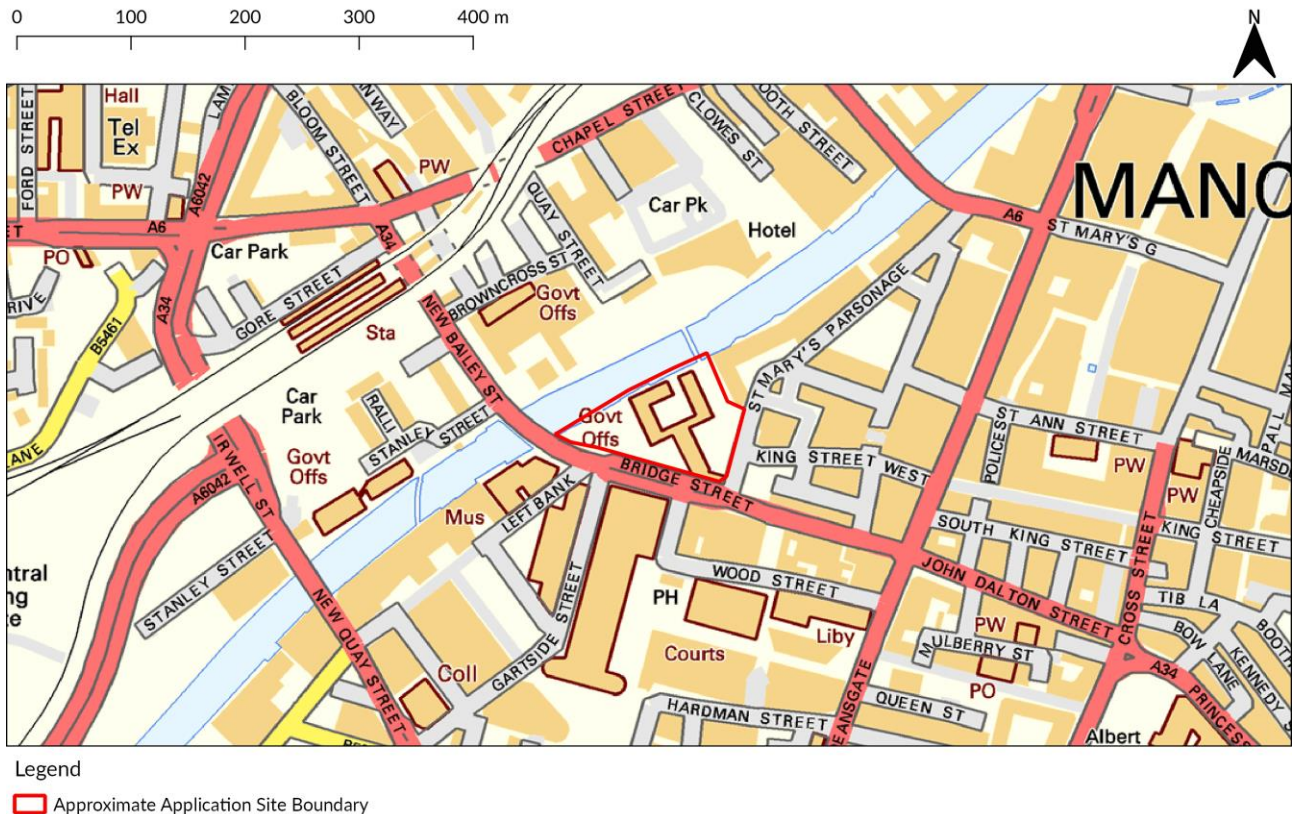


Figure 1: Location of the Application Site. Contains OS Data © Crown Copyright and Database rights 2022.

1.3 Scope of Assessment.

An email detailing the proposed methodology for the Air Quality Assessment was provided to MCC on the 18th August 2022. The proposed scope of assessment was agreed with the EHO, a copy of the correspondence with MCC has been included in Appendix 1.

A summary of the scope of the assessment includes:

- Determination of baseline scenario, using MCC monitoring data;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts during the operational phase;
- Assessment of the suitability of the Application Site for the Proposed Development; and
- Identification of required mitigation measures.

2. Legislation, Policy and Guidance Documents.

2.1 Air Quality Strategy and Local Air Quality Management.

The Environment Act 1995 (Part IV)¹ requires the Secretary of State to publish an air quality strategy and local authorities to review and assess the quality of air within their boundaries. The latter has become known as Local Air Quality Management (LAQM).

The Air Quality Strategy² provides the policy framework for local air quality management and assessment in the UK. It sets out air quality standards and objectives for key air pollutants. These standards and objectives are designed to protect human health and the environment. The Strategy also sets out how the different sectors of industry, transport and local government, can contribute to achieving these air quality objectives.

Local authorities are required to identify whether the objectives have been, or will be, achieved at relevant locations. If the objectives are not achieved, the authority must declare an Air Quality Management Area (AQMA) and should prepare an Air Quality Action Plan (AQAP) within 12 months. The action plan must identify appropriate measures and policies that can be introduced to help achieve the objective(s).

The air quality objectives set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000³, and the Air Quality (England) (Amendment) Regulations 2002⁴.

The objectives for nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}) are given in Table 1. The target dates for meeting the NO₂ and PM₁₀ objectives were 2005 and 2004, respectively. It should be noted that local authorities in England have a flexible role in working towards reducing emissions and concentrations of PM_{2.5}.

Table 1: Air Quality Objectives for NO₂, PM₁₀ and PM_{2.5}

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO ₂)	1-hour Mean	200 µg/m ³ Not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
Fine Particulate Matter (PM ₁₀) [†]	24-hour Mean	50 µg/m ³ Not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³
Fine Particulate Matter (PM _{2.5}) [†]	Annual Mean	25 µg/m ³
<u>Notes:</u> [†] Measured gravimetrically.		

The objectives apply at locations where members of the public are likely to be regularly present and exposed over the averaging period of the objective. Examples of where the annual mean objectives should apply are provided in LAQM.TG22⁵ and include building façades of residential properties, schools, hospitals. The annual mean objectives are not relevant for the building facades of offices or other places of work where members of the public do not have regular access, nor kerbsides nor gardens.

The 24-hour objective for PM₁₀ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels.

The 1-hour objective for NO₂ also applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations, pavements of busy shopping streets, carparks and bus stations which are not fully enclosed. The 1-hour objective does not apply at kerbside sites where the public do not have regular access.

The Environment Act 2021¹ was passed into UK law in November 2021 and establishes a legally binding duty on government to bring forward at least two new air quality targets in secondary legislation by 31 October 2022. These targets are expected to focus on reducing concentrations of, and exposure to, PM_{2.5} and will be accompanied by a new National Air Quality Strategy in 2023.

2.2 EU Limit Values.

The European Union has also set limit values for NO₂, PM₁₀ and PM_{2.5}; these are legally binding and have been implemented into English legislation by The Air Quality Standards Regulations 2010⁶ and The Air Quality Standards (Amendment) Regulations 2016⁷.

The limit values for NO₂, PM₁₀ and PM_{2.5} are the same as the English objectives (given in Table 1), but applied from 2010 for NO₂, 2005 for PM₁₀ and 2015 for PM_{2.5}. The limit values apply at all locations (apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway).

2.3 WHO Guideline Values.

The WHO produced air quality guidelines⁸ in 2005 to offer global guidance on thresholds and limits for key air pollutants that pose health risks. The WHO guidelines for NO₂, PM₁₀ and PM_{2.5} concentrations are provided in Table 2 below. The WHO also released revised air quality guidelines in September 2021⁸. The revised annual mean thresholds for NO₂, PM₁₀ and PM_{2.5} are 10 µg/m³, 15 µg/m³ and 5 µg/m³ respectively. However, the revised guidelines are yet to be included in policies and carried into effect. The 2005 WHO guidelines have been set out in Table 2 below.

Table 2 WHO guidelines for NO₂, PM₁₀ and PM_{2.5}

Pollutant	Time Period	Objective
NO ₂	1-hour Mean	200 µg/m ³ 1-hour mean
	Annual Mean	40 µg/m ³ annual mean
PM ₁₀	Annual Mean	20 µg/m ³
PM _{2.5}	Annual Mean	10 µg/m ³

2.4 The Environment Act.

The Environment Act 2021⁹ acts as the UK's new framework of environmental protection and came into force on 1st April 2022. With regard to air quality, the Environment Act establishes a legally binding duty on government to bring forward at least two new air quality targets in secondary legislation by 31st October 2022. Target objectives¹⁰ under consideration for air quality include:

- Reducing the annual mean level of fine particulate matter (PM_{2.5}) in ambient air (as required by Clause 2 of the Environment Act); and
- Reducing population exposure to PM_{2.5}.

2.5 General Nuisance Legislation.

Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

Fractions of dust greater than 10 µm in diameter (i.e. greater than PM₁₀) typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the Air Quality Strategy. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

2.6 UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations.

The UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations¹¹ was published in 2017. This sets out roles and responsibilities and measures for bringing NO₂ levels within the mandatory limit values in the shortest

possible time. Under the UK Plan, local authorities with roadside concentrations of NO₂ forecast by the Defra as exceeding legal limits are identified; MCC has been identified as one of these local authorities and as a result a Clean Air Zone (CAZ) is planned to be implemented in 2023.

2.7 Building Regulations.

The Building Regulations help to ensure that new buildings, conversions, renovations and extensions (domestic or commercial) are going to be safe, healthy and high performing. Detailed regulations cover specific topics including structural integrity, fire protection, accessibility, energy performance, acoustic performance, protection against falls, electrical and gas safety. Part F of the Building Regulations (2021)¹² provides guidance on indoor air quality and the pollutant concentrations that must not be exceeded in buildings for use as either dwellings or non-dwellings.

2.8 Clean Air Strategy.

The Clean Air Strategy (CAS)¹³, published in 2019, sets out the Government's proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

2.9 Planning Policy.

2.9.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2021¹⁴ sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

Paragraph 55: "Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."

Paragraph 104: "...c) opportunities to promote walking, cycling and public transport use are identified and pursued; d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account - including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains... ."

Paragraph 105: "Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health."

Paragraph 174: "Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality."

Paragraph 185: "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

Paragraph 186: "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should

ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”

Paragraph 188: “The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

The NPPF is supported by Planning Practice Guidance (PPG)¹⁵.

The PPG states that:

Paragraph 001 (Reference ID: 32-001-20191101): “Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance relevant Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit or where the need for emissions reductions has been identified.”

Paragraph 002 (Reference ID: 32-002-20191101): Plans may need to consider ways in which the development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable”.

Paragraph 005 (Reference ID: 32-005-20191101): “Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and / or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

The PPG also sets out the information that may be required in an air quality assessment, stating that:

Paragraph 007 (Reference ID: 32-007-20191101): “Assessments need to be proportional to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. The scope and content of supporting information is best discussed and agreed between the local planning authority and applicant before it is commissioned”.

It also provides guidance on options for mitigating air quality impacts, and makes clear that:

Paragraph 008 (Reference ID: 32-008-20191101): “Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact.”

2.10 Local Policy.

2.10.1 Manchester City Council Core Strategy Development Plan

The Manchester Core Strategy Development Plan¹⁶, adopted in July 2012 and covering the years 2012-2027, states in Policy EN16 that:

“The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester’s principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new developments the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas”

Other policies which relate to air quality include:

Policy CC 5 Transport:

“The Transport Strategy for Manchester City Centre will be delivered to ensure that transport is managed in a way which supports the projected growth of the City Centre. [...] Proposals will be supported that improve pedestrian safety, improve air quality and increase the scope of accessible public realm improvements.”

Policy EN 7 Energy Infrastructure Opportunities

“There will be a general presumption in favour of low and zero carbon decentralised energy schemes, subject to the following considerations:

- The cumulative impact of energy schemes will be taken into account when considering applications, to include modelled impacts on air quality and landscape character, with reference to Policy EN16 Air Quality.”

2.10.2 Manchester Citywide Unitary Development Policies – Environmental Improvement and Protection

The Application Site is located within Area ‘25’ of MCC’s City Centre Small Area Policies Map¹⁷. Within this area, Part 1 of the Extant Unitary Development Policies (UDP) – Environmental Improvement and Protection¹⁸ applies. This policy aims to encourage high-quality development within the city centre to enhance the City’s environment. Whilst this policy does not specifically mention air quality, it highlights the Council’s efforts to improve the environment through improved traffic routing schemes and increased “green” areas between city developments.

2.10.3 Local Air Quality Management in Manchester

An AQMA was declared in Greater Manchester in 2016 for exceedances of the annual mean NO₂ AQO. The AQMA covers the 10 districts of Greater Manchester, including arterial routes, district centres, and the airport. Consequently, an Air Quality Action Plan¹⁹ was published in 2016 to set out actions and measures to bring about an improvement in air quality, to benefit the health of the population. The current Air Quality Action Plan expired in 2021, however it has not yet been replaced so it will be considered for the purpose of this assessment. The proposed actions cover three main themes:

- Reduce Traffic - for instance by encouraging modal shift from private vehicle use to public transport, cycling and walking.
- Increasing Efficiency - of traffic movement by reducing congestion and stop-start travel to achieve a smoother emission profile and overall lower emissions, which may be particularly significant at peak hours.
- Improve Fleet - by incentivising the replacement of older, more polluting vehicles with newer, smaller, cleaner, lower-emissions vehicles.

Alongside the Air Quality Action Plan, the Greater Manchester Low Emission Strategy²⁰ presents a long-term approach to carbon emissions and air quality in the period up to 2040. The key aims of the strategy are to:

- Support the UK Government in meeting all EU thresholds for key pollutants at the earliest date;
- Contribute to reducing Greater Manchester’s carbon footprint, in line with the Greater Manchester Climate Change Strategy; and
- Reduce air pollution as a contributor to ill-health in Greater Manchester.

A Clean Air Zone (CAZ) covering Greater Manchester, for which an outline business case²¹ was submitted in March 2019, will launch in May 2022 and will target the most polluting commercial vehicles including older Heavy Duty Vehicles (HDVs), buses, coaches, taxis and private hire vehicles.

Furthermore, Transport for Greater Manchester established the Greater Manchester Electric Vehicle (GMEV) Network in 2013. The network offers free electric vehicle charging for a nominal annual fee to help the mass adoption of electric vehicles across the region, playing a central role in improving air quality.

2.10.4 Transport Strategy for Manchester City Centre 2040

The Transport Strategy for Manchester City Centre²² adopted in March 2021 sets out the strategy for Manchester to create a well-connected, zero-carbon centre offering residents, workers and visitors a place to live.

2.11 Assessment Guidance.

The primary guidance documents consulted in undertaking this assessment are detailed below.

2.11.1 Defra Local Air Quality Management Technical Guidance

Defra Local Air Quality Management Technical Guidance (LAQM.TG22)⁵ was published for use by local authorities in their LAQM review and assessment work. The document provides key guidance in aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

2.11.2 EPUK and IAQM 'Air Quality Guidance for Planning'

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance²³ to help ensure that air quality is properly accounted for in the development control process. It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

2.11.3 IAQM 'Construction and Demolition Dust Guidance'

Guidance on the assessment of dust from demolition and construction has been published by the IAQM²⁴. The guidance provides a methodology to determine the dust emission magnitude and provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities. This allows for the identification of appropriate mitigation measures that are defined within further IAQM guidance.

2.11.4 Manchester City Council Air Quality & Planning Technical Guidance

This technical guidance was published in February 2022²⁵ to inform applicants, developers and air quality consultants of the 'Our Manchester Strategy 2016-2025'. It sets out the relevant local policies and acknowledges the city's current AQMA situation, breaches of AQOs and ambitions to reduce PM_{2.5} concentrations to below the 2005 WHO guidelines by 2030. The guidance also provides best practice recommendations for electric vehicle charging infrastructure.

3. Assessment Methodology.

3.1 Consultation.

The approach to the assessment, as described in section 1.3, was provided to the MCC for review on the 18th of August 2022. A response was received on 22nd of August 2022 accepting the methodology. The correspondence with MCC is detailed in Appendix 1.

3.2 Existing Air Quality in the Study Area.

A baseline air quality review was undertaken to determine the existing air quality in the vicinity of the Application Site. This desk-top study was undertaken using the following sources:

- Air quality data for MCC, including a review of the MCC air quality reports and local monitoring data;
- The UK Pollutant Release and Transfer Register²⁶;
- Background pollution maps taken from Defra's Local Air Quality Management (LAQM) website²⁷;
- Pollution Inventory from the Environment Agency²⁸
- The UK Ambient Air Quality Interactive Map²⁹;
- Ordnance Survey data and aerial photography from Google Maps.

3.3 Construction Phase Impacts.

3.3.1 Construction Dust Assessment

The assessment of construction dust impacts has been undertaken in line with the IAQM methodology. Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout

The risk of dust emissions was assessed for each activity with respect to:

- Potential loss of amenity due to dust soiling; and
- The risk of health effects due to a significant increase in exposure to PM₁₀.

The first stage of the assessment involves screening to determine whether there are any sensitive receptors within the threshold distances defined by the IAQM guidance. A detailed assessment of the impact of dust from construction sites will be required where:

- A 'human receptor' is located within 350 m of the boundary of the Site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance;
- An 'ecological receptor' is located within 50 m of the boundary of the Site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance.

The magnitude of dust emission for each activity is determined on the basis of the guidance, indicative thresholds, information available relating to the project and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the mitigation requirements.

Descriptors for magnitude of impact and impact significance used in this assessment of construction phase dust are given in the guidance²⁴ available online.

3.3.2 Construction Traffic

3.3.2.1 Construction Traffic Emissions Screening

A screening assessment has been undertaken with reference to the following EPUK and IAQM guidance indicative criteria:

- a change of LDV flows of more than 100 AADT (within an AQMA); and/or
- a change of HDV flows of more than 25 AADT (within an AQMA).

3.3.2.2 NRMM Emissions Screening

Non-Road Mobile Machinery (NRMM) refers to mobile machines, transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads. NRMM emissions have been screened following the guidance in Defra's LAQM.TG22.

3.4 Operational Phase Impacts.

3.4.1 Road Traffic Impacts

The screening assessment has been undertaken with reference to the following documents:

- Defra's LAQM.TG22; and
- EPUK and IAQM guidance indicative criteria, i.e.:
 - a change of LDV flows of more than 100 AADT (within an AQMA); and/or
 - a change of HDV flows of more than 25 AADT (within an AQMA).

Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that "the criteria provided are precautionary and should be treated as indicative", and "it may be appropriate to amend them on the basis of professional judgement".

Where impacts can be screened out there is no need to progress to a more detailed assessment.

3.4.2 Site Suitability Assessment

A quantitative assessment has been undertaken to consider the site suitability which refers to the exposure of future occupants of the Proposed Development to existing air quality. Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted at the proposed receptors in 2026, which is the earliest anticipated year of occupation for the Proposed Development. Regression analysis on the nearby long-term monitoring locations for NO₂ showed that there was not a significant reduction in calculations over the past five years of monitoring data. Therefore, future year traffic data with baseline (2019) emission factors and baseline (2019) background concentrations has been used for the site suitability assessment as this will give a precautionary prediction of onsite concentrations.

Both the long-term and short-term AQOs apply for the residential building and the short-term AQOs apply for the office building. However, the long-term NO₂ AQO has also been considered for the office building in order to predict compliance with Part F of the Building Regulations (2021)¹².

As the MVHR intake locations are subject to change, proposed receptor locations have been chosen to represent, the worst-case locations at the façades of the residential and commercial buildings, whilst providing coverage of the concentrations anticipated across the Proposed Development. Concentrations of NO₂, PM₁₀ and PM_{2.5} have only been presented for the ground, first and second floor, as no exceedances were predicted.

Concentrations at proposed receptors have been modelled using the dispersion model ADMS Roads (version 5.0.1)³⁰. This model has been extensively validated and is widely used by regulators, government departments, consultancies and industry. Emission factors have been used from EFT v11.0³¹. The NO_x to NO₂ calculator v8.1 has been used to convert the total NO_x concentrations to NO₂ concentrations.

The model has been run using meteorological data from Manchester Airport in the verification year of 2019. Traffic data has been sourced from the Department for Transport (DfT) surveyed data, which has been processed and a growth factor applied for the future year by the appointed Transport Consultants, Curtins. Background concentrations from Defra's background mapping predictions have been used for the baseline year of 2019 and kept constant in the future year. Emissions are expected to reduce in the future but there are inherent uncertainties when predicting future emissions so to keep the emission factors constant at the baseline year is considered a reasonable worst-case consideration.

Full details of the air quality modelling methodology are provided in Appendix 2.

The following scenarios have been modelled:

- Base year (2019);
- Future year traffic (2026) with 2019 emission factors and 2019 background concentrations.

The location of the proposed receptors is provided in Table 3 and shown in Figure 2.

Table 3: Proposed receptor locations at the façade of the Proposed Development.

Proposed Receptor ID	Proposed Receptor Location	Grid Reference		Height (m)
		X	Y	
R1.g	Residential Ground Floor south façade	383367	398352	1.5
R2.g	Residential Ground Floor south façade	383388	398347	1.5
R3.g	Residential Ground Floor north façade	383370	398378	1.5
R4.g	Residential Ground Floor north façade	383391	398376	1.5
C1.g	Commercial Ground Floor south façade	383451	398331	1.5
C2.g	Commercial Ground Floor south east façade	383477	398335	1.5
C3.g	Commercial Ground Floor east façade	383488	398366	1.5
C4.g	Commercial Ground Floor south west facade	383427	398363	1.5
C5.g	Commercial Ground Floor north east façade	383460	398406	1.5
C6.g	Commercial Ground Floor north west façade	383437	398422	1.5
C7.g	Commercial Ground Floor west facade	383408	398385	1.5
C8.g	Commercial Ground Floor north west façade	383416	398412	1.5
R1.1	Residential Ground Floor south façade	383367	398352	4.5
R2.1	Residential Ground Floor south façade	383388	398347	4.5
R3.1	Residential Ground Floor north façade	383370	398378	4.5
R4.1	Residential Ground Floor north façade	383391	398376	4.5
C1.1	Commercial Ground Floor south façade	383451	398331	4.5
C2.1	Commercial Ground Floor south east façade	383477	398335	4.5
C3.1	Commercial Ground Floor east façade	383488	398366	4.5
C4.1	Commercial Ground Floor south west facade	383427	398363	4.5
C5.1	Commercial Ground Floor north east façade	383460	398406	4.5
C6.1	Commercial Ground Floor north west façade	383437	398422	4.5
C7.1	Commercial Ground Floor west facade	383408	398385	4.5
C8.1	Commercial Ground Floor north west façade	383416	398412	4.5
R1.2	Residential Ground Floor south façade	383367	398352	7.5
R2.2	Residential Ground Floor south façade	383388	398347	7.5
R3.2	Residential Ground Floor north façade	383370	398378	7.5
R4.2	Residential Ground Floor north façade	383391	398376	7.5
C1.2	Commercial Ground Floor south façade	383451	398331	7.5

Proposed Receptor ID	Proposed Receptor Location	Grid Reference		Height (m)
		X	Y	
C2.2	Commercial Ground Floor south east façade	383477	398335	7.5
C3.2	Commercial Ground Floor east façade	383488	398366	7.5
C4.2	Commercial Ground Floor south west facade	383427	398363	7.5
C5.2	Commercial Ground Floor north east façade	383460	398406	7.5
C6.2	Commercial Ground Floor north west façade	383437	398422	7.5
C7.2	Commercial Ground Floor west facade	383408	398385	7.5
C8.2	Commercial Ground Floor north west façade	383416	398412	7.5

NOTE: Proposed receptor floor level denoted as 'x.g' for ground 'x.1' for first floor and 'x.2' for second floor.
R = Proposed receptors associated with the residential building
C = Proposed receptors associated with the commercial building

It should be noted that the proposed receptors identified above are considered to be worst-case locations in terms of sensitivity to poor air quality.

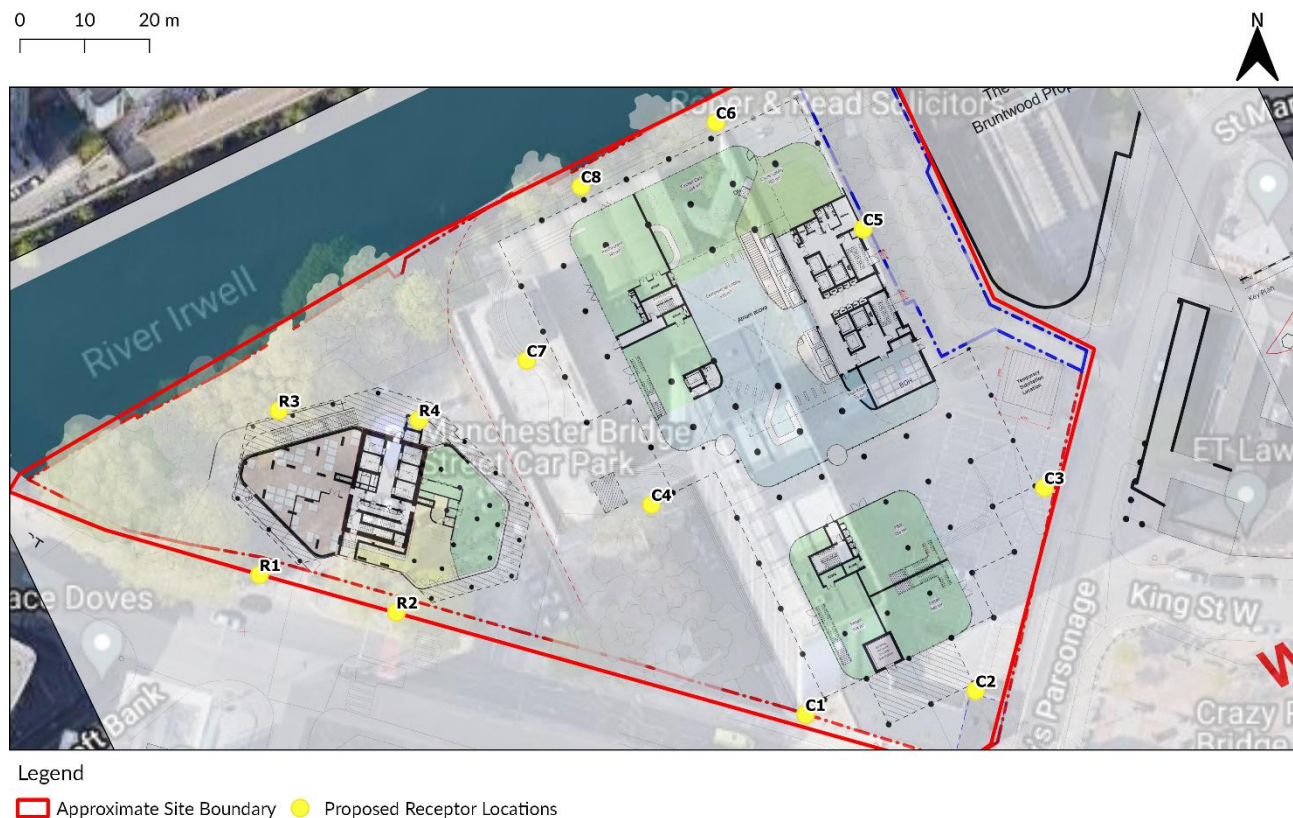


Figure 2: Proposed receptor locations at the Proposed Development on Ground Floor and the façade of the development at each floor. Overlaid on Roof Level Plan. Contains Ordnance Survey Data © Crown Copyright 2022

3.5 Assessment of Significance.

3.5.1 Construction Phase Impacts

The IAQM guidance²⁴ on the assessment of dust from demolition and construction states that the primary aim of the risk assessment is to identify site specific mitigation that, once implemented, should ensure that there will be no significant effect. Therefore, the assessment has been used to determine an appropriate level of mitigation for the construction phase.

The determination of which mitigation measures are recommended include elements of professional judgement and the professional experience of the consultants preparing this report is set out in Appendix 2.

3.5.2 Operational Phase Impacts

The EPUK and IAQM guidance²³ has been used to assess the potential for significant impacts as a result of vehicle emissions from traffic associated with the Proposed Development. The focus of the guidance is to assess traffic emission impacts and advises on how to describe the air quality impacts and their significance.

3.5.3 Site Suitability

To determine the significance of predicted air quality impacts based upon a site suitability assessment, the EPUK and IAQM guidance states:

“Where the air quality is such that an air quality objective 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.”

4. Baseline Environment.

This section sets out the available information on air quality in the vicinity of the Application Site.

4.1 Site Setting.

The Application Site is located within MCC area of administration at approximate NGR: X 383430, Y 398380.

The Application Site is currently occupied by Albert Bridge House and two car parks. Albert Bridge House includes three parts, a 17-storey building, flanked by a five and two storey building. Albert Bridge House is currently vacant. The River Irwell lies immediately to the north of the Application Site with Bridge Street to the south and St Mary's Parsonage to the east. Trinity Bridge lies in close proximity to the north-eastern corner of the Site and crosses the River Irwell.

4.2 Local Air Quality Management Review and Assessment.

The most recent MCC ASR³² (2021) states that there has been a gradual improvement in air quality throughout the area. There is currently one AQMA in the MCC area which covers the city centre along with many of the larger roads throughout and around the city which was declared due to exceedances in the annual mean NO₂ concentration AQO. The Application Site is within the MCC AQMA.

Exceedances of the annual mean NO₂ AQO were still recorded at some of the nearby monitoring locations during 2019, but the 1-hour mean NO₂ concentration AQO was met. Similarly, the respective AQOs for PM₁₀ and PM_{2.5} have not recorded any exceedances between 2015 and 2020.

Additionally, based on the available 2020 monitoring data from the most recent MCC ASR, released in 2021 during the COVID-19 pandemic, there has been a decrease in pollutant concentrations across monitoring locations within MCC. The reduction in pollutant concentrations during 2020 is directly attributable to reduced traffic levels as a result of Government implemented lockdowns. As such, the pollutant concentrations recorded at monitoring stations in 2020 are not considered to be representative of "normal" air quality conditions. Whilst it is expected that as a result of the COVID-19 pandemic that behaviours will change in the future, the impact of this on air quality long-term is currently unknown and therefore the use of 2020 data has been omitted from this assessment however has been shown in the baseline assessment for information purposes.

In line with the Manchester City Council Air Quality & Planning Technical Guidance, the WHO Guideline for PM_{2.5} has been considered in this assessment, as MCC has pledged to achieve the PM_{2.5} air quality guideline of 10 µg/m³ by 2030.

4.3 Local Air Quality Monitoring.

There are 20 automatic monitoring stations within the Greater Manchester Combined Authority area, with three operated by MCC. The closest site is Manchester Piccadilly monitoring location, approximately 820 m east of the Application Site. This monitoring location is also a part of the UK Automatic and Rural Network (AURN), which is a countrywide network of air quality monitoring stations operated on behalf of Defra. Monitoring data for AURN sites is available from the UK Air Information Resource website (UK-AIR). Of these automatic monitoring locations, two are in close vicinity of the Application Site and share a representative environment. Recent monitoring data between 2015 and 2020 for these automatic monitoring location is detailed in Table 4 and a visual representation of the locations of the passive diffusion tube and automatic monitoring location is shown in Figure 3.

Table 4: Automatic Monitoring Locations

Monitoring site and distance (m) from site boundary (approx.)	Objective	2015	2016	2017	2018	2019	2020
NO₂							
MAN3 – Manchester Piccadilly (820 m)	Annual mean (µg/m ³)	39	40	36	35	36	27
	Number of hours with concentrations >200 µg/m ³	1	0	1	0	0	0
MAN1 – Manchester Oxford Road (1290 m)	Annual mean (µg/m ³)	66	66	65	62	59	36
	Number of hours with concentrations >200 µg/m ³	60	90	6	2	1	0
PM₁₀							
MAN3 – Manchester Piccadilly (820 m)	Annual mean (µg/m ³)	20	20	20	21	20	15
	Number of days with concentrations > 50 µg/m ³	3	3	3	2	7	1
MAN1 – Manchester Oxford Road (1290 m)	Annual mean (µg/m ³)	28	27	27	30	26	15
	Number of days with concentrations > 50 µg/m ³	25	16	15	15	18	5
PM_{2.5}							
MAN3 – Manchester Piccadilly (820 m)	Annual mean (µg/m ³)	10	10	8	11	12	8
Note: Exceedances of the relevant AQO are shown in bold .							

The automatic monitoring data at the closest monitoring location, Manchester Piccadilly, has been in compliance with both the annual mean and 1-hour mean NO₂ concentration AQOs between 2015 and 2020. Similarly, it has not recorded any exceedances for either of the PM₁₀ or PM_{2.5} AQOs between 2015 and 2020. However, PM_{2.5} concentrations have exceeded the WHO guideline of 10 µg/m³ in both 2018 and 2019.

At the other nearby monitoring location, Manchester Oxford Road, the annual mean NO₂ concentration has consistently exceeded the AQO between 2015 and 2019. It also exceeded the 1-hour mean NO₂ AQO in 2015 and 2016, however this has not been the case in more recent years. The PM₁₀ concentrations monitored at this monitoring location has complied with the respective AQOs but exceeded the WHO guideline.

0 250 500 750 1,000 m



Legend

Approximate Site Boundary Automatic Monitoring Locations Passive Diffusion Tube Monitoring Locations

Figure 3: Automatic Monitoring Locations in the Vicinity of the Application Site. Contains OS Data © Crown Copyright and Database rights 2022

MCC operate 38 passive diffusion tubes to monitor NO₂ concentrations. The Application Site is also close to passive diffusion tube monitoring locations operated by Salford City Council (SCC). Monitoring data from both authorities have been included for this analysis. A review of the most recent monitoring data available indicated that there are seven passive diffusion tube monitoring locations within a 1 km vicinity of the Application Site. Recent monitoring results are shown in Table 5 and the passive diffusion tube locations are illustrated in Figure 3.

Table 5: Passive Diffusion Tube Monitoring Results

Site ID	Site Type	Site Name	Distance (m) from site (approx.)	Annual Mean NO ₂ Concentration (µg/m ³)					
				2015	2016	2017	2018	2019	2020
SA39NO (SCC)	Roadside	Trinity Way / Chapel Street	350	38.5	46.8	41.6	39.1	41.7	30.4
SA27NO (SCC)	Roadside	Trinity Way	350	35.4	39.8	36.8	34.1	37.2	26.7
MA24NO (MCC)	Kerbside	Princess Street	550	55.2	45.3	44.7	40.3	40.8	26.8
MA26ANO (MCC)	Urban Background	Chelthams School	670	33.1	37.1	35.5	33.4	33.0	22.9
SA79NO (SCC)	Roadside	Chapel Street	750	-	-	-	-	41.1	27.3

Site ID	Site Type	Site Name	Distance (m) from site (approx.)	Annual Mean NO ₂ Concentration (µg/m ³)					
				2015	2016	2017	2018	2019	2020
MA59NO (MCC)	Urban Background	Piccadilly Gardens	830	34.9	40.8	35.7	31.6	33.1	22.3
MA77NO (MCC)	Urban Background	Hewitt School	850	37.5	44.2	38.8	41.0	43.7	26.9
Note: Exceedances of the NO ₂ annual mean objective of 40µg/m ³ are shown in bold .									

As shown in Table 5 above, exceedances of the annual mean NO₂ concentration AQO have been recorded at four of the seven locations in 2019. This includes the closest passive diffusion tube monitoring location, SA39NO, located 350 m west of the Application Site. SA39NO showed an exceedance of the AQO in 2016, 2017 and 2019. MA24NO, which is along the same road as the Application Site, also showed exceedances in every year from 2015 to 2019. Regression analysis was conducted on the nearby monitoring sites with five years' of data between 2015 and 2019, the results are presented in Figure 6 and Figure 7. The regression analysis indicates that NO₂ concentrations recorded at nearby background monitoring locations over the last five years have not been reducing at a statistically significant rate. However, NO₂ concentrations recorded at nearby roadside and kerbside monitoring locations over the last five years have been reducing at a statistically significant rate. This suggests that there has been a significant improvement in air quality recorded at roadside locations in the vicinity of the Application Site over the last five years.

Furthermore, as outlined in LAQM.TG22, an annual mean NO₂ concentration of 60 µg/m³ or above is often used to indicate a possible exceedance of the 1-hour mean NO₂ AQO. There have been no NO₂ concentrations in exceedance of 60 µg/m³ at any of the passive diffusion tube monitoring locations within the vicinity of the Application Site within the most recent five years of representative monitoring data. As such, exceedance of the 1-hour mean NO₂ AQO is unlikely.

4.4 Industrial Pollution.

A desk-based review of potential industrial sources using the UK Pollutant Release and Transfer Register did not identify any significant industrial or waste management sources of air pollution that are likely to affect the Application Site with regard to air quality.

4.5 Defra Predicted Concentrations.

The background concentrations have been obtained from the national maps published by Defra²⁷. These estimated concentrations are produced on a 1 km by 1 km grid basis for the whole of the UK. The Application Site falls into grid square X 383500 Y 398500 and the predicted concentrations for this grid square for NO₂, PM₁₀ and PM_{2.5} are provided in Table 6 for 2019, the most recent year with available monitoring data, 2022, the current year, and for 2026, the anticipated opening year for the Proposed Development.

Table 6: Predicted Background Concentrations

Year	Predicted Background Concentration (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
2019	28.2	13.1	8.5
2022	25.2	12.5	8.0
2026	20.0	12.1	7.8

As shown in Table 6, background concentrations are below the relevant AQOs and WHO Guidelines for all pollutants.

4.6 Summary of Background Data.

The Application Site is located within the MCC's AQMA.

The baseline assessment has shown that annual mean NO₂ concentrations recorded within the vicinity of the Application Site have exceeded or been close to exceeding the AQO in 2019. However, the 1-hour mean NO₂ concentrations have complied with the AQO. Similarly, PM₁₀ and PM_{2.5} concentrations have been in compliance with their respective AQOs and WHO guidelines at both automatic monitoring stations that record it, but annual mean PM_{2.5} exceeded the WHO guidelines at the Manchester Piccadilly automatic monitoring station in 2018 and 2019.

Defra predicted background concentrations showed that NO₂, PM₁₀ and PM_{2.5} will all comply with the AQOs and WHO guidelines in 2019, 2022 and the anticipated opening year, 2026.

There are no significant industrial or waste management sources of air pollution that are likely to affect the Application Site in regard to air quality.

5. Construction Phase Assessment.

The potential for air quality impacts during the construction of the Proposed Development are assessed in this section.

5.1 Construction Phase Dust Assessment.

The risk of dust impacts is based on the potential dust emissions magnitude and the sensitivity of the area. These two factors are then combined to determine the risk of dust impacts with no mitigation applied. In the absence of any site-specific information, a higher risk category has been applied to represent a worst-case scenario.

5.1.1 Assessment Screening

There are 'human receptors' within 350 m of the Application Site but no designated habitat sites within 50 m of the Application Site boundary or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance. The closest ecological receptor to the Application Site is Clayton Vale, which is designated as a Local Nature Reserve (LNR) approximately 4 km to the east.

Therefore, an assessment of construction dust on ecological receptors can be screened out from this assessment but an assessment of construction dust at human receptors is required.

5.1.2 Potential Dust Emission Magnitude

The potential magnitude of dust emissions from demolition, earthworks, construction and trackout have been assessed, as identified in Table 7.

Table 7: Predicted Magnitude of Dust Emissions

Activity	Magnitude	Justification
Demolition	Large	Demolition of the existing building on the Application Site is expected to take place at heights greater than 20 m above ground level, whilst the demolition volume is expected to be greater than 50,000 m ³ . The existing building contains potentially dusty material, including concrete, and brick. As such, in-line with IAQM guidance, the magnitude of dust emissions from demolition is considered to be large.
Earthworks	Large	The soil type at the Application Site is sandy and loamy ³³ , thereby having a high potential for dust emissions. Earthworks will affect 14,000 m ² , thereby above the 10,000 m ² threshold in the IAQM guidance for the magnitude of dust emissions from earthworks to be considered large.
Construction	Large	The exact construction volumes for the Application Site are not currently available, but estimates taken from the most recent building plans show that the total volume will be greater than 100,000 m ³ . It is expected that concrete will be used as a construction material which has a high potential for dust generation. Therefore, in line with IAQM guidance, the magnitude of dust emissions from construction is anticipated to be large.
Trackout	Medium	The soil type at the Application Site is sandy and loamy, as such it can be considered potentially dusty. As the Application Site is directly along Bridge Street (A34) and is entirely paved already. The unpaved road length required will likely be between 50 and 100 m in length. The number of HDV movements anticipated during the construction phase less than 25. As a worst-case scenario, the potential magnitude of dust emissions from trackout is considered to be medium.

5.1.3 Sensitivity of the Study Area

The sensitivity of the area takes into account the following factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM₁₀, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees or other vegetation, to reduce the risk of wind-blown dust.

The sensitivity of the area and the factors considered are detailed in Table 8.

Table 8: Sensitivity of the Area

Sensitivity Type	Factors	Sensitivity of Area	
		On – Site Activity	Trackout
Dust Soiling	Within 50 m of the Application Site, there are multiple large apartment buildings containing over 100 residential units which would be considered high sensitivity receptors. In addition to this, there are over 10-100 office, commercial and hospitality spaces within 50 m of the Application Site. Overall, the sensitivity of the area to dust soiling from on-site activity would be considered high. For trackout, the distances are measured from the side of the roads used by construction traffic. As construction traffic will likely rely on Bridge Street (A34), there are over 100 high sensitivity receptors within 50 m of the roadside up to 200 m from the Application Site. Therefore, the sensitivity of the area to dust soiling from trackout is high.	High	High
Human Health	Within 50 m of the Application Site, there are multiple large apartment buildings containing over 100 residential units which would be considered high sensitivity receptors. The Defra predicted background concentration of PM₁₀ is 12.5 µg/m³. As such, in line with IAQM guidance, the sensitivity of the area to the human health effects of PM₁₀ produced by on-site activity is low. For trackout, the distances are measured from the side of the roads used by construction traffic. As construction traffic will likely rely on Bridge Street (A34), there are over 100 high sensitivity receptors within 20 m of the roadside up to 200 m from the Application Site. Therefore, the sensitivity of the area to the human health effects of PM₁₀ from trackout is medium.	Low	Medium

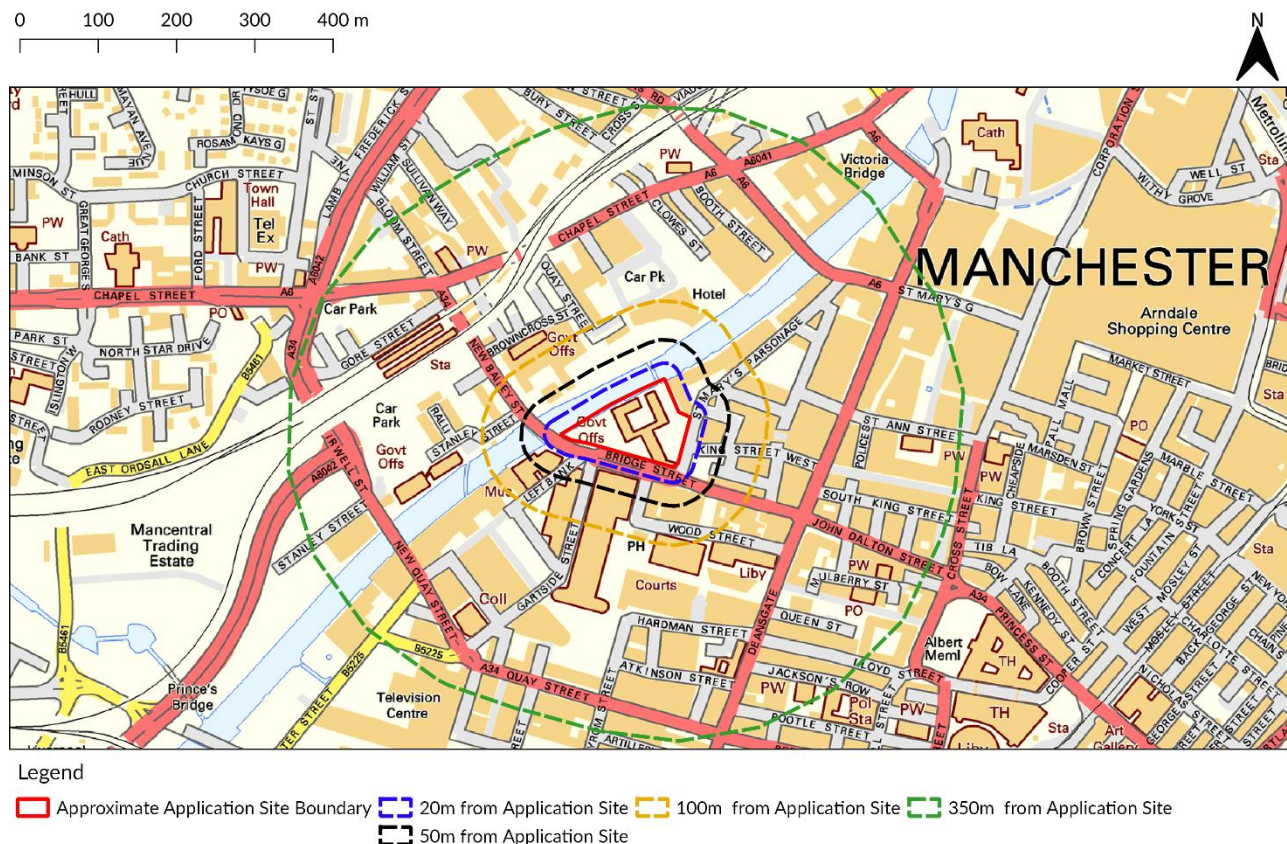


Figure 4: IAQM distance band criteria from the Application Site boundary. Contains Ordnance Survey Data © Crown Copyright 2022

5.1.4 Risk of Dust Impacts

The outcomes of the assessments of potential magnitude of dust emissions and the sensitivity of the area are combined to determine the risk of impact. This risk is then used to inform the selection of appropriate mitigation. Table 9 details the risk of dust impacts for demolition, earthworks, construction and trackout activities.

Table 9: Summary of Potential Unmitigated Dust Risks

Potential Impact	Sensitivity – On-site activity	Sensitivity - Trackout	Demolition	Earthworks	Construction	Trackout
Magnitude			Large	Large	Large	Medium
Dust Soiling Impacts	High	High	High Risk	High Risk	High Risk	Medium Risk
Human Health Impacts	Low	Medium	Medium Risk	Low Risk	Low Risk	Low Risk

5.2 Construction Phase – Vehicular Pollutants.

The Application Site is located within the Manchester City AQMA and therefore the lower screening criterion (i.e. 100 LDV and 25 HDV) would apply.

The appointed transport consultants, Curtins, have confirmed that the development quantum is not anticipated to result in a significant increase in movements above the EPUK and IAQM criterion. Additionally, the duration of movements will be short-term in nature and are not considered further within the context of this assessment. Therefore, in accordance with the criterion presented within EPUK and IAQM guidance, additional road vehicle

trips during the construction phase of the Proposed Development “can be considered to have insignificant effects” on air quality.

5.3 Construction Phase – Non-Road Mobile Machinery.

Exhaust emissions of NO_x and fine particulate matter (PM₁₀ and PM_{2.5}) from Non-Road Mobile Machinery (NRMM), associated with construction sites, may have a significant effect on local air quality. Typically, NRMM is and, therefore there is a potential for NRMM emissions to adversely affect local air quality as a result of the Proposed Development.

LAQM.TG22 guidance states that, with the application of suitable control measures and site management, exhaust emissions from on-site NRMM are “unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed”.

6. Operational Phase Assessment.

The potential for air quality impacts during the operation of the Proposed Development are assessed in this section.

6.1 Road Traffic Emissions Screening Assessment.

Road traffic data associated with the Proposed Development has been provided by Curtins, the appointed Transport Consultants for the project. The predicted flows indicate that there will be a reduction in the 24-hour AADT LDV and HDV movements on the local road network as a result of the Proposed Development when compared with the existing use.

This is therefore below the indicative criteria in the EPUK and IAQM guidance of a change of more than 100 AADT and/or 25 AADT HDV and therefore no further assessment is required.

In accordance with the EPUK and IAQM guidance, the impacts on air quality from operational phase traffic generation are considered to be not significant.

6.2 Combustion Plant Screening Assessment.

The energy strategy for the Proposed Development has been confirmed and will be utilising zero emission technologies in the form of ASHP with one life safety generator installed for each of the residential and commercial buildings that will be used for back-up purposes only and with limited testing (less than 18 hours a year). Therefore, there is not expected to be any significant impact to local air quality from the proposed energy plant during normal operation and a detailed assessment has been screened out in line with the EPUK and IAQM guidance. A detailed assessment of emissions from combustion plant has therefore been screened out.

6.3 Site Suitability.

As presented in section 2 in line with LAQM.TG22, the annual mean, 24-hour mean, and 1-hour mean AQOs apply to the residential building of the Proposed Development. As outlined in LAQM.TG22, an annual mean NO₂ concentration of 60 µg/m³ or above is often used to indicate a possible exceedance of the 1-hour mean NO₂ AQO, therefore 60 µg/m³ has been used as an air quality assessment level (AQAL) for the 1-hour mean NO₂ AQO. As the ground and first floor of the residential block are for communal use and there are no proposed apartments, only the 1-hour mean AQO applies to these floors. Only the 1-hour mean AQO applies to the commercial building of the Proposed Development. However, the annual mean NO₂ AQO has also been considered for all proposed receptors in order to comply with the Building Regulations Approved Document Part F¹² therefore 40 µg/m³ has also been used as an AQAL and has been designated ADP F (for approved document part F). As such, this section considers the predicted annual mean, 24-hour mean, and the 1-hour mean pollutant concentrations at the Application Site.

The future year (2026) with baseline (2019) emission factors has been used for the site suitability assessment as this will give a precautionary prediction of onsite concentrations. Table 10 shows concentrations at ground floor, first floor, and second floor.

There are not predicted to be any exceedances of the annual mean or 1-hour mean AQOs for NO₂ at all proposed receptors as shown in Table 10, therefore compliance with the AQOs and ADP F is expected. The annual mean AQO has not been exceeded for PM₁₀ or PM_{2.5} at any proposed receptors on any floor. Additionally, the WHO Guidelines for NO₂ PM₁₀ and PM_{2.5} are expected to be met at all proposed receptors on all floors.

Table 10: Predicted Concentrations of NO₂, PM₁₀ and PM_{2.5} in 2026 at proposed receptors.

Proposed Receptor	Level Height (m)	NO ₂			PM ₁₀		PM _{2.5}	
		Concentration (µg/m ³)	% of AQAL	% of ADPF	Concentration (µg/m ³)	% of AQAL	Concentration (µg/m ³)	% of AQAL
R1.g	1.5	38.0	63.4%	95.0%	14.4	35.9%	9.3	37.1%
R2.g	1.5	37.7	62.9%	94.3%	14.3	35.8%	9.2	37.0%
R3.g	1.5	32.0	53.3%	79.9%	13.6	34.0%	8.8	35.2%
R4.g	1.5	31.7	52.9%	79.3%	13.6	33.9%	8.8	35.1%
C1.g	1.5	37.1	61.9%	92.8%	14.2	35.6%	9.2	36.8%
C2.g	1.5	33.7	56.1%	84.2%	13.8	34.5%	8.9	35.7%
C3.g	1.5	30.9	51.6%	77.4%	13.5	33.6%	8.7	34.9%
C4.g	1.5	30.3	50.5%	75.7%	13.4	33.4%	8.7	34.7%
C5.g	1.5	30.2	50.3%	75.5%	13.4	33.4%	8.7	34.6%
C6.g	1.5	30.0	50.1%	75.1%	13.3	33.4%	8.7	34.6%
C7.g	1.5	31.0	51.7%	77.6%	13.5	33.7%	8.7	34.9%
C8.g	1.5	32.0	53.3%	80.0%	13.6	34.0%	8.8	35.2%
R1.1	4.5	33.2	55.4%	83.1%	13.7	34.4%	8.9	35.6%
R2.1	4.5	33.3	55.4%	83.2%	13.7	34.4%	8.9	35.6%
R3.1	4.5	31.4	52.3%	78.4%	13.5	33.8%	8.8	35.0%
R4.1	4.5	31.2	52.0%	78.1%	13.5	33.7%	8.7	35.0%
C1.1	4.5	33.3	55.5%	83.2%	13.7	34.4%	8.9	35.6%
C2.1	4.5	32.3	53.8%	80.8%	13.6	34.1%	8.8	35.3%
C3.1	4.5	30.7	51.1%	76.7%	13.4	33.6%	8.7	34.8%
C4.1	4.5	30.2	50.3%	75.4%	13.4	33.4%	8.7	34.6%
C5.1	4.5	30.1	50.1%	75.2%	13.3	33.4%	8.7	34.6%
C6.1	4.5	30.0	49.9%	74.9%	13.3	33.3%	8.6	34.6%
C7.1	4.5	30.7	51.2%	76.9%	13.4	33.6%	8.7	34.8%
C8.1	4.5	31.4	52.3%	78.5%	13.5	33.8%	8.8	35.0%
R1.2	7.5	30.6	76.4%	N/A	13.4	33.5%	8.7	34.8%
R2.2	7.5	30.6	76.6%	N/A	13.4	33.5%	8.7	34.8%
R3.2	7.5	30.5	76.3%	N/A	13.4	33.5%	8.7	34.8%
R4.2	7.5	30.5	76.2%	N/A	13.4	33.5%	8.7	34.7%
C1.2	7.5	30.7	51.2%	76.9%	13.4	33.6%	8.7	34.8%
C2.2	7.5	30.8	51.4%	77.0%	13.4	33.6%	8.7	34.8%
C3.2	7.5	30.3	50.5%	75.7%	13.4	33.4%	8.7	34.7%
C4.2	7.5	29.9	49.9%	74.8%	13.3	33.3%	8.6	34.6%
C5.2	7.5	29.9	49.8%	74.7%	13.3	33.3%	8.6	34.5%

Proposed Receptor	Level Height (m)	NO ₂			PM ₁₀		PM _{2.5}	
		Concentration (µg/m ³)	% of AQAL	% of ADPF	Concentration (µg/m ³)	% of AQAL	Concentration (µg/m ³)	% of AQAL
C6.2	7.5	29.8	49.7%	74.5%	13.3	33.3%	8.6	34.5%
C7.2	7.5	30.3	50.5%	75.7%	13.4	33.4%	8.7	34.7%
C8.2	7.5	30.6	51.0%	76.4%	13.4	33.5%	8.7	34.8%

NOTES:
Proposed receptor floor level denoted as 'x.g' for ground 'x.1' for first floor and 'x.2' for second floor.
ADP F = Building Regulations Approved Document Part F are an additional requirement for all occupied spaces and represents the annual mean NO₂ AQO i.e. 40 µg/m³.
R = Proposed receptors associated with the residential building
C = Proposed receptors associated with the commercial building
N/A = where AQAL and ADPF represent the same concentration

The maximum onsite concentration is recorded at proposed receptor R1.g on the ground floor, for all three pollutants. This proposed receptor is fronting Bridge Street, the main source of emissions in the vicinity of the Application Site. The NO₂ concentration predicted at this location is 38.0 µg/m³, which is 95% of the annual mean AQO, WHO Guidelines and the Building Regulations Approved Document F criteria. Additionally, all proposed receptors are predicted to be below the 60 µg/m³ indicative criteria and, therefore in accordance with the Defra guidance, exceedances of the 1-hour mean NO₂ AQO are considered unlikely.

PM₁₀ at proposed receptor R1.g is 14.4 µg/m³ which is 35.9% of the annual mean AQO and 72% of the WHO Guideline. Based upon the maximum predicted annual mean PM₁₀ concentration, this equates to 1 day when 24-hour mean PM₁₀ concentrations may be greater than 50 µg/m³ therefore, the number of exceedances is within the 35 day compliance limit of the 24-hour mean AQO.

PM_{2.5} at location R1.g is 9.3 µg/m³ which is 37.1 % of the annual mean AQO, and this represents 93% of the WHO Guideline.

6.3.1 Significance of Air Quality Impacts

To determine the significance of predicted air quality impacts based upon a site-suitability assessment, such as that undertaken as part of this assessment, the EPUK and IAQM guidance states:

“Where the air quality is such that an air quality objective 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.”

With regards to the Proposed Development, the unmitigated impact significance associated with the Proposed Development has been predicted in accordance with the stated assessment methodology. The following factors have been considered when providing justification:

- The Proposed Development will not introduce any new receptor into an area of exceedance of the annual or 1-hour mean NO₂ AQO and therefore in line with the WHO Guideline and the Building Regulations Approved Document F based on the modelled onsite concentrations;
- The Proposed Development will not introduce any new receptor exposure into an area of exceedance of the annual mean PM₁₀ AQOs or the WHO guideline based on the modelled onsite concentrations; and
- The Proposed Development will not introduce any new receptor exposure into an area of exceedance of the annual mean PM_{2.5} AQO or the WHO guideline based on the modelled onsite concentrations.

As no exceedances of the considered AQOs are predicted, mitigation measures are not required for the operational phase of the Proposed Development. As such, the overall effect is considered to be 'not significant'.

7. Mitigation.

7.1 Construction Phase.

To mitigate the potential impacts during the construction phase it is recommended that mitigation measures as detailed in the IAQM guidance are implemented. These mitigation measures have been carefully selected for the Proposed Development and are based upon the dust risk categories outlined in the guidance²⁴.

It is recommended that the local authority approve a Dust Management Plan (DMP) prior to works commencing on site, and that this is implemented using an appropriately worded planning condition. Table 11 below details the measures that should be incorporated in the DMP. For general mitigation measures, which excludes those specifically targeted towards demolition, earthworks, construction and trackout (which are given towards the end of the table), high risk measures have been applied as these represent the highest risk category determined in Table 9. This approach is consistent with the IAQM guidance.

Table 11: Mitigation Measures

Issue	Mitigation Measure
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.
Dust Management Plan	Develop and implement a Dust Management Plan (DMP), which may include measures to control emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM ₁₀ 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 off- site, and the action taken to resolve the situation in the log book.
	Hold regular liaison meetings with other high risk construction sites within 500 m 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	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling check of surfaces such as street furniture, cars, window sills within 100 m of the site boundary, with cleaning to be provided if necessary.
	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.
	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 is a large site, before work on a phase commences.

Issue	Mitigation Measure
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 active 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 cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicles/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 applicable).
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing)
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.
	Minimize 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.
Demolition	Soft strip inside building before demolition.
	Ensure effective water suppression is used during demolition activities.
	Avoid explosive blasting, using appropriate manual or mechanical alternatives.
	Bag and remove any biological debris before demolition.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

Issue	Mitigation Measure
	Use Hessian, mulches or trackifiers 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	Avoid scabbling (roughening of concrete surfaces) if possible.
	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.
	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 powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	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 in continuous use.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site log book.
	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
	Access gates to be located at least 10 m from receptors where possible.

Potential dust effects during the construction phase are considered to be both temporary and short-term in nature. The impacts are determined to be 'temporary' as they will only potentially occur throughout the construction phase and 'short term' because these will only arise at particular times when certain activities and meteorological conditions combine to create the predicted level. Notwithstanding this, with the application of the above dust control and mitigation measures, it is considered that residual effect at all receptors will be 'not significant' in accordance with the IAQM guidance.

7.1.1 Construction Phase Road Traffic Emissions

The need for further assessment of the potential air quality impacts associated with construction phase road traffic emissions, principally HDV movements, have been screened out as they are considered to have an insignificant effect on air quality and mitigation measures are not required.

7.1.2 Construction Phase NRMM Emissions

In accordance with Part 4 of the IAQM Control of Dust and Emissions guidance, all NRMM would need to adhere to the emissions standards for NO₂ and PM₁₀ set out for NRMM. It is therefore considered the likely effects of construction plant on local air quality would be insignificant.

7.2 Operational Phase.

7.2.1 Road Traffic Emissions

Potential air quality impacts associated with operational phase development trips have been screened out from further assessment as ‘the impacts [on air quality from operational phase movements] can be considered to have insignificant effects’ in accordance with the EPUK and IAQM Guidance. Therefore, mitigation measures, such as a sustainable travel plan are not considered to be required.

7.2.1 Combustion Plant Emissions

The energy strategy for the Proposed Development has been confirmed and will be utilising zero emission technologies in the form of ASHP with generators used for back-up purposes only and with limited testing (less than 18 hours a year). Therefore, there will be no impact to local air quality from the proposed energy plant during normal operation and a detailed assessment has been screened out in line with the EPUK and IAQM guidance.

7.2.2 Manchester City Council Air Quality & Planning Technical Guidance

The Proposed Development is currently expected to meet the recommended guidance for electric vehicle charging infrastructure in line with the Manchester City Council Air Quality & Planning Technical Guidance as all 24 parking spaces will be provided with EV charging points.

7.2.3 Site Suitability Review

The modelling assessment of concentrations at proposed receptors at the façade of the Proposed Development on all floors has shown that there are no predicted exceedances of the NO₂ annual mean AQO. There are not expected to be any exceedances at the façade of the Proposed Development of the 1-hour mean NO₂, 24-hour mean PM₁₀ or the annual mean PM₁₀ and PM_{2.5} AQOs and therefore no mitigation is required.

As no exceedances of any considered AQO are predicted, this follows the 1st hierarchy principle of the IAQM guidance to ‘prevent and avoid’ exposure³⁴. Therefore, no embedded mitigation into the Proposed Development design (in the form of mechanical ventilation with filtration, for example) is required and natural ventilation is possible from an air quality perspective.

8. Summary and Conclusions.

This report details the potential air quality impacts associated with the construction and operation of a proposed mixed-use development at Albert Bridge House.

The findings of the assessment are as follows:

- A qualitative assessment of the potential dust impacts during the construction of the Proposed Development has been undertaken. Through good practice and implementation of appropriate mitigation measures, it is expected that the release of dust would be effectively controlled and mitigated, with resulting impacts considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature;
- An air quality screening assessment of the air quality impacts of traffic generated by the Proposed Development has undertaken and the effects are not predicted to be significant, therefore further assessment is not required;
- Energy provision for the Proposed Development will be all-electric via ASHP, with life-safety generators used for back-up purposes only and with limited testing (less than 18 hours a year).. As such, the air quality impacts from the energy provision of the Proposed Development are not expected to be significant and a detailed assessment is not required;
- A site suitability assessment has been undertaken to assess the suitability of the Application Site for the Proposed Development. The modelling assessment of concentrations at proposed receptors at the façade of the Proposed Development on all floors has shown that there are no predicted exceedances of the NO₂ annual mean and 1-hour mean, 24-hour mean and annual mean PM₁₀ or the annual mean PM_{2.5} AQOs and therefore no mitigation is required, and windows can be openable.

Based on the information above, it is considered that air quality should not be viewed as a constraint to planning and the Proposed Development conforms to the principles of National Planning Policy Framework and the MCC Local Plan.

9. Glossary of Terms.

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AQO	Air Quality Objective
ASHP	Air Source Heat Pumps
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicles (> 3.5 tonnes gross vehicle weight)
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles ($\leq$ 3.5 tonnes gross vehicle weight)
$\mu\text{g}/\text{m}^3$	Micrograms per cubic metre
MCC	Manchester City Council
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be $\text{NO}_2 + \text{NO}$)
NPPF	National Planning Policy Framework
NRMM	Non-Road Mobile Machinery
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 micrometres
$\text{PM}_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 micrometres
PPG	Planning Practice Guidance
SCC	Salford City Council
SPG	Supplementary Planning Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
Trackout	The process involving the transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site

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Appendix 1 – EHO Consultation.

From: Graeme Souter <graeme.souter@manchester.gov.uk>
Sent: 22 August 2022 11:26
To: Stockton, Phoebe
Subject: RE: Albert Bridge House - Air Quality Assessment Methodology

Hi Phoebe

Thanks for confirming that you will review our guidance when finalising the report. Can I also just confirm that the assessment should include mitigation measures for controlling fugitive dust emissions during the demolition / construction phases, a future occupier exposure assessment and the report will need to include assessment of PM2.5 and PM10.

Regardless of the outcome of the assessment, we will require clean air intakes recommending for this site but I note there is reference to these in your proposals. The location of the intakes will need to be recommended and we will also need details of the clean air filters to be installed recommending along with a maintenance strategy for the filters (how often replaced, who is responsible, how are they made aware of the requirements and details of the necessary replacement filter to be installed and also how will the ongoing maintenance be upheld if the building is sold or management company changes). This may be one for the applicant to address

We will also need confirmation that the car parking provision will comply with our requirements regarding EV charging points and details will need to be provided within the report

We may have further comment or recommendations once the application and report has been submitted but I hope the above helps in the meantime

Kind regards

Graeme

From: Stockton, Phoebe <PhoebeStockton@hoarelealea.com>
Sent: 19 August 2022 10:41
To: Rebecca Twigg <rebecca.twigg@manchester.gov.uk>; EnvH Licensing <envh.licensing@manchester.gov.uk>
Cc: Graeme Souter <graeme.souter@manchester.gov.uk>
Subject: RE: Albert Bridge House - Air Quality Assessment Methodology

Some people who received this message don't often get email from phoebestockton@hoarelealea.com. [Learn why this is important](#)

Hi Rebecca,

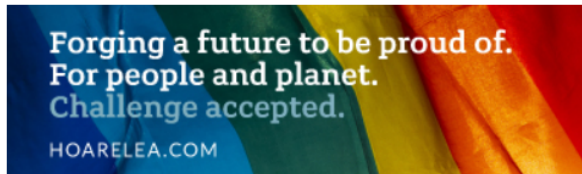
Much appreciated for the quick response, we will review and incorporate the Air Quality and Planning Guidance as part of our assessment.

Noted regarding the consultation process.

Kind regards,
Phoebe Stockton
Air Quality Consultant

DDI +44 20 3668 7227

Email phoebestockton@hoarelealea.com



From: Rebecca Twigg <rebecca.twigg@manchester.gov.uk>
Sent: 19 August 2022 09:54
To: EnvH Licensing <envh.licensing@manchester.gov.uk>; Stockton, Phoebe <PhoebeStockton@hoarelealea.com>
Cc: Graeme Souter <graeme.souter@manchester.gov.uk>
Subject: Fw: Albert Bridge House - Air Quality Assessment Methodology

You don't often get email from rebecca.twigg@manchester.gov.uk. [Learn why this is important](#)

Hi team,

Please can you load the below request on Flare, cat code ECK.

Phoebe - I don't cover this area but your enquiry will be loaded onto our system and allocated to the Deansgate/Commercial ward officer Graeme Souter (copied in), who will respond in due course. In the meantime please review [MCC's AQ & Planning guidance](#) now available online; as long as your scope and methodology proposals comply with our guidance then you do not also need to consult us.

Please register any future enquiries at www.manchester.gov.uk rather than sending them to myself.

Regards,

Rebecca

Rebecca Twigg-Purcell
Environmental Protection Officer
Environmental Protection
Environmental Health
The Neighbourhoods Directorate
Manchester City Council

Tel: 0161 234 1368
Internal: 31368
Email: rebecca.twigg@manchester.gov.uk
Website: www.manchester.gov.uk

For latest news and updates follow us on Twitter [@EnvHealthMcr](https://twitter.com/EnvHealthMcr)

From: Stockton, Phoebe <PhoebeStockton@hoarelealea.com>
Sent: 18 August 2022 17:52
To: Rebecca Twigg <rebecca.twigg@manchester.gov.uk>

Cc: Day, Andy1 <AndyDay@hoarelea.com>

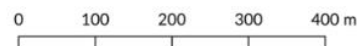
Subject: RE: Albert Bridge House - Air Quality Assessment Methodology

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Good afternoon Rebecca,

I hope that you are well.

I am contacting you as Hoare Lea have been instructed to undertake an air quality assessment for a proposed residential / commercial development at Bridge St, Manchester M60 9AF. Please see below Application Site boundary for reference.



Legend

Approximate Site Boundary

The Application Site is currently occupied by Albert Bridge House and two car parks. The proposal includes the demolition of the existing buildings at the Application Site and construction of a residential tower (approximately 270 homes) and a commercial tower (c. 51,462 m²).

An Environmental Impact Assessment (EIA) will be undertaken for this development but it is proposed that air quality will be scoped out as there aren't expected to be any significant environmental effects. Therefore a standalone Air Quality Assessment is being undertaken using the following methodology:

- A baseline assessment will be undertaken using data from Manchester City Council (MCC)'s most recent Annual Status Report (ASR).
- DEFRA's background pollution maps will be used to establish background concentrations in the area.
- The traffic generation from the Proposed Development has been confirmed by appointed transport consultants and represents a net reduction compared to the current use. The change in trips generated by the site is therefore below the criteria outlined in the EPUK/IAQM Guidance for within an AQMA of a change of more than 100 AADT LDV and/or 25 HDV AADT. Therefore, it is not considered necessary to undertake a detailed assessment

- of road traffic impacts at existing receptors in the vicinity, and a screening assessment will be undertaken to provide evidence of the traffic figures.
- The traffic generation during the construction and demolition phase has been confirmed by appointed transport consultants and is below the criteria outlined in the EPUK/IAQM for within an AQMA of a change of more than 100 AADT LDV and/or 25 HDV AADT.
 - A detailed assessment of site suitability will be undertaken to assess the air quality conditions for future occupants:
 - ADMS-Roads V5.0 will be used to predict concentrations of NO₂, PM₁₀ and PM_{2.5} for a verification year (2019) and the proposed opening year (2026) with the Proposed Development in place. Concentrations will be modelled at the facades of the Proposed Development at the worst-case locations, as well as the proposed air intake locations.
 - It is proposed that EFT 11.0 emission factors and 2019 meteorological data from Manchester Airport will be used. We will look to use diffusion tubes near to the proposed site for model verification.
 - The assessment will be undertaken in line with the EPUK/IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality' January 2017.
 - The air quality assessment will also consider impacts during the construction phase of the Proposed Development using the IAQM document 'Assessment of dust from demolition and construction' (June 2016).
 - Energy provision for the Proposed Development will be all-electric and will not involve any combustion processes or release of combustion emissions during normal operation. Generators will be for back-up purposes only and therefore have been screened out of a detailed assessment as they will be used for testing and therefore less than 18 hours.
 - If any impacts are observed, suitable mitigation will be recommended.

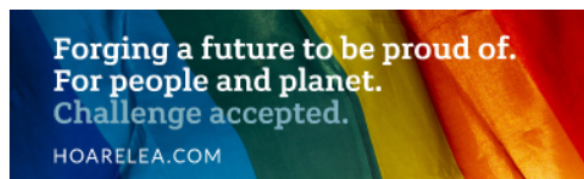
I would be grateful if you could please confirm your acceptance of the proposed methodology and provide me with any comments you may have. If you would like to discuss further, please do not hesitate to contact me on the number below.

Kind regards,

Phoebe Stockton
Air Quality Consultant

DDI +44 20 3668 7227

Email phoebestockton@hoarelealea.com



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Appendix 2 – Road Traffic Model Input Data.

Model Input Parameters

Table 12: Model Input Parameters

Parameter	Description	Input Variable
Surface Roughness	Surface roughness of the modelling domain as a function of land use	A roughness length z_0 of 0.75m was used within the assessment area of this dispersion modelling study. This value is for 'cities' and therefore considered appropriate for the surface roughness of the dispersion modelling assessment area.
Road Source Emissions	Source of the emission factors used	EFT v.11.0
Emission Year	Modelling year used to factor the traffic emissions	2019 for the verification year and future years.
NO _x to NO ₂ Conversion	Conversion from NO _x concentrations to NO ₂ concentrations	NO _x to NO ₂ calculator v8.1. General inputs – 2019, All other urban UK traffic.
Road Type	Road type within the EFT emission database	Urban (not London)
Elevation of Road	Height of the road link above ground level	0m no elevation – roads are at ground level
Road Width	Width of the road link	Road widths obtained from Google Street View
Road Speed	Road speed in km/h	Variable based on local speed limits, as confirmed by Curtins, appointed transport consultant. Roads were also adjusted for road geometry in line with LAQM.TG22.
Meteorology	Representative hourly sequential meteorological data	Manchester Airport 2019
Background	Background pollutant concentration considered during the modelling	Defra 2018 background maps 1km x 1km grid squares for the verification year (2019).
Output	Output as gridded or specified points	At specified points as detailed in Table 3 and Figure 2
Pollutant Output	Pollutants modelled and averaging time	NO ₂ , PM ₁₀ and PM _{2.5} annual mean

Traffic Data

Annual Average Daily Traffic (AADT) flows were provided by Curtins, transport consultants for the Proposed Development.

Traffic speeds were estimated using national speed limits and professional experience, with junctions and roundabouts modelled at 20 kph in line with LAQM.TG22. The traffic data used in this air quality assessment are shown in Table 13 and displayed in Figure 5.

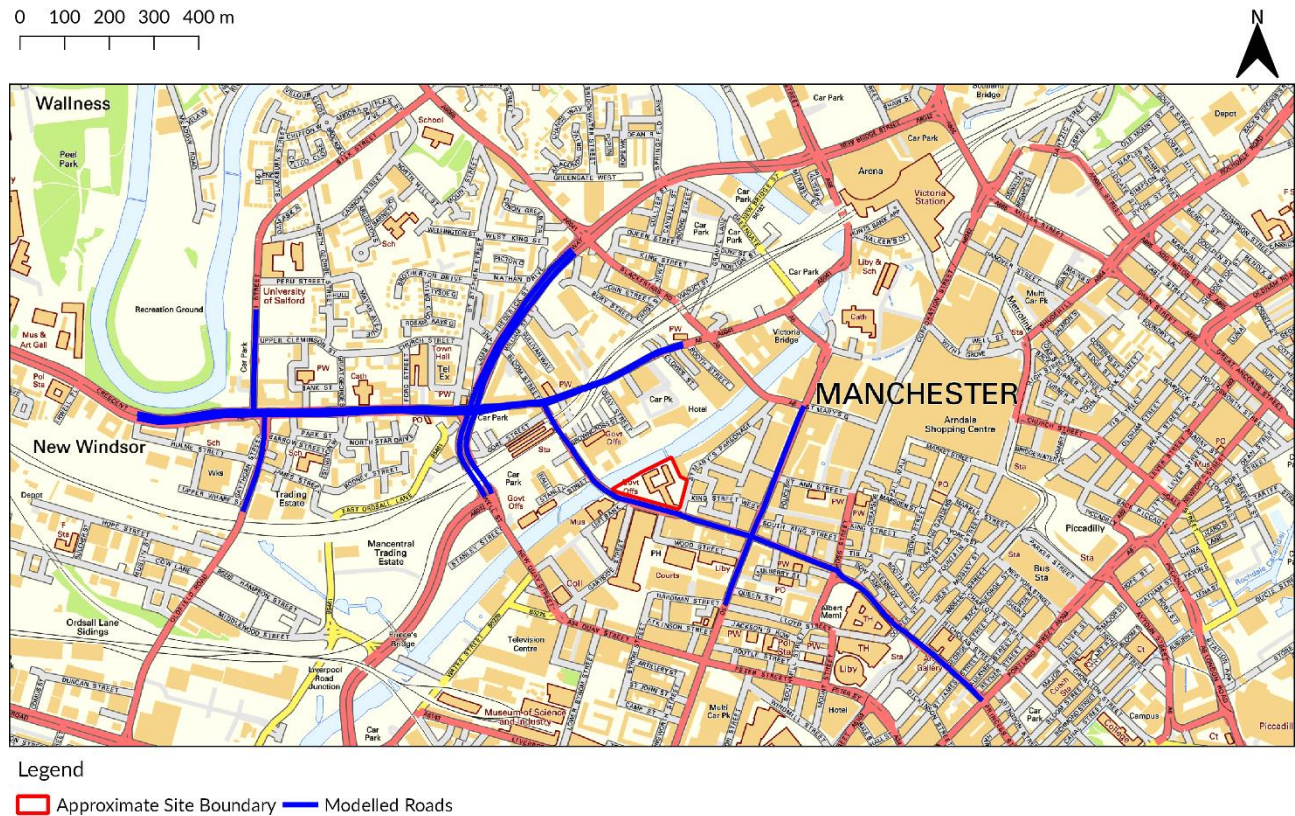


Figure 5: Roads Modelled. Contains Ordnance Survey data © Crown copyright and database right 2022.

Table 13: Summary of Traffic Data used in the Assessment.

Source	Road Name	Base 2019 Total AADT	Base 2019 HDV	DS 2026 Total AADT	DS 2026 HDV	Speed (km/h)
3	A34 Bridge Street (east of St Mary's Parsonage)*	6753	997	7190	1062	20 – 32.2
4	A34 Bridge Street (west of St Mary's Parsonage)	6753	997	7194	1063	20 – 32.2
7	Deansgate (north of A34 Bridge Street)	6615	608	7143	657	20 – 32.2
8	John Dalton Street	8663	896	9359	968	20 – 32.2
9	Deansgate (south of A34 Bridge Street)	11067	253	11885	272	20 – 32.2
10E	A6 Chapel Street (east of A6042 Ring Road) – Eastbound flow	5479	709	5893	763	20 – 48.3

Source	Road Name	Base 2019 Total AADT	Base 2019 HDV	DS 2026 Total AADT	DS 2026 HDV	Speed (km/h)
10W	A6 Chapel Street (east of A6042 Ring Road) – Westbound flow	4058	614	4356	660	20 – 48.3
11E	A6 Chapel Street (west of A6042 Ring Road) – Eastbound flow	9318	835	10053	901	20 – 48.3
11W	A6 Chapel Street (west of A6042 Ring Road) – Westbound flow	8107	795	8743	858	20 – 48.3
12N	A6042 Ring Road (north of Chapel Street) – Northbound flow	14629	399	15821	432	20 – 48.3
12S	A6042 Ring Road (north of Chapel Street) – Southbound flow	15712	412	16992	446	20 – 48.3
13N	A6042 Ring Road (south of Chapel Street) – Northbound flow	6280	158	6794	171	20 – 48.3
13S	A6042 Ring Road (south of Chapel Street) – Southbound flow	6471	86	7001	94	20 – 48.3
14	A5066 Adelphi Street	8261	352	8938	381	20 – 32.2
15	A5066 Oldfield Street	9755	222	10554	241	20 – 32.2
16E	A6 Chapel Street (west of A5066) – Eastbound flow	12473	939	13467	1014	20 – 48.3
16W	A6 Chapel Street (west of A5066) – Westbound flow	12209	863	13181	932	20 – 48.3
17	Princess Street	2361	907	2541	977	20 – 32.2

Clarification on traffic data provided by Curtins::

- It has been assumed for both the existing and proposed car parks that each space will be occupied by one vehicle throughout the day (i.e. arrive in the morning and leave in the evening) with no turnover of vehicles during the day.
- *DfT data was not available for this road link therefore an estimate has been provided based on the count for A34 Bridge Street (west of St Mary's Parsonage)
- Where multiple DfT counts were available within the area, the point with the most recent manual count up to 2019 has been applied.
- The distribution of these trips has been based on a high-level analysis of 2011 census travel to work data for the Manchester 054 MSOA
- Committed developments are not specifically included in the figures, however, to account for growth a general TEMPRO growth factor has been applied which is designed to account for committed developments and future traffic changes.

Emissions

Emissions were calculated using the most recent version of the Emissions Factor Toolkit (EFT) v11.0³¹ The traffic data was entered into the EFT in order to calculate a combined emission rate for each of the road links in the modelled network.

To understand whether air quality is improving in the MCC and SCC area surrounding the Application Site, a five-year regression analysis has been undertaken on average annual mean NO₂ concentrations recorded at eight nearby long-term monitoring locations (as outlined in Table 4 and Table 5) with five years' of data between 2015

and 2019. The regression analysis has been completed on roadside and kerbside monitoring locations (Figure 6) and at urban background and urban centre monitoring locations (Figure 7).

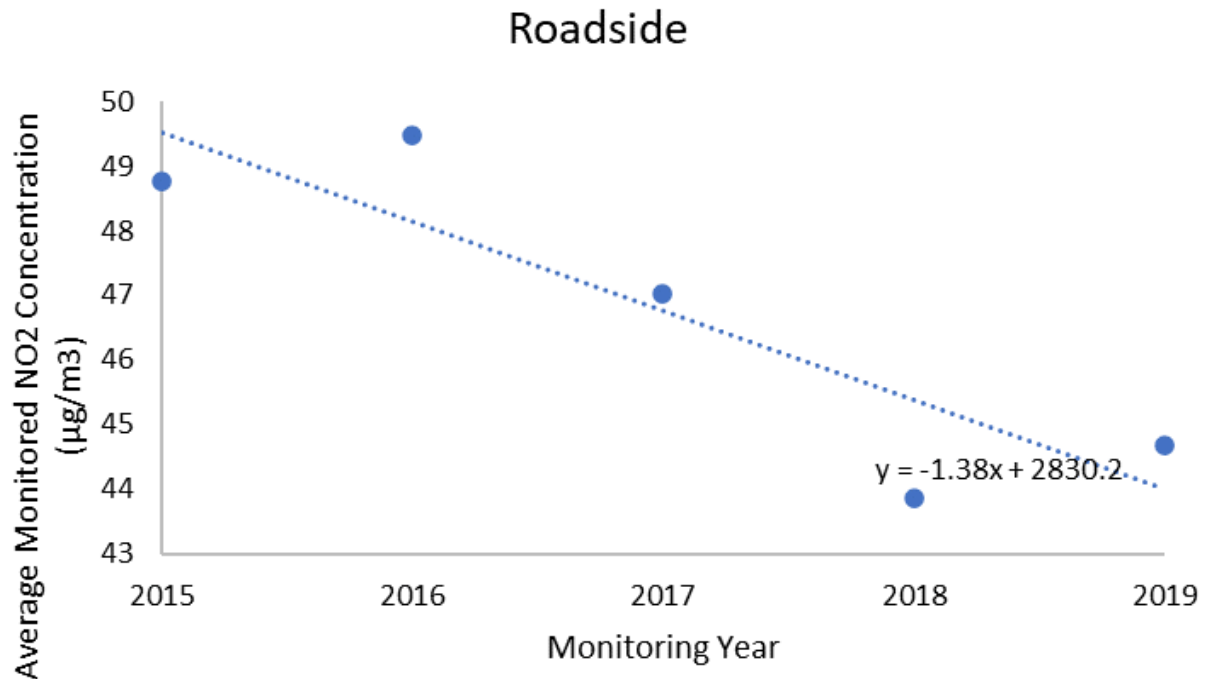


Figure 6: Five-year linear regression analysis for four nearby roadside and kerbside monitoring locations

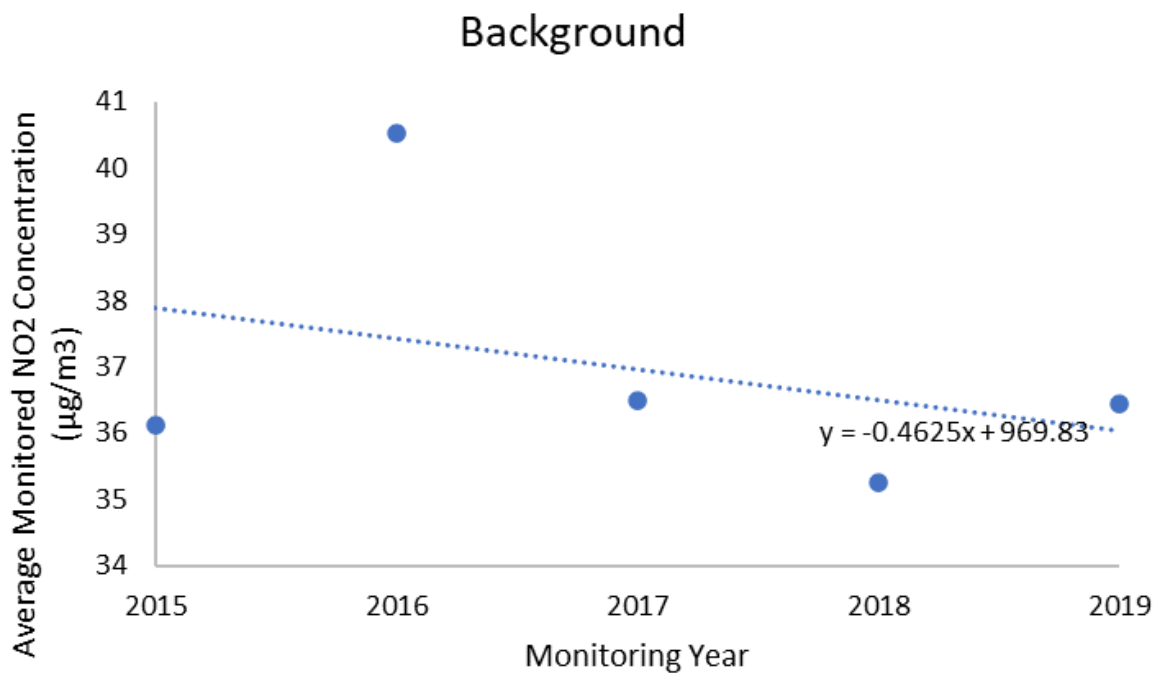


Figure 7: Five-year linear regression analysis for four nearby background and urban centre monitoring locations

The regression analysis indicates that NO₂ concentrations recorded at nearby roadside and kerbside monitoring locations over the last five years have been reducing at a statistically significant rate of -1.38 µg/m³. However, the regression analysis of urban background and urban centre NO₂ concentrations recorded over the last five years indicates that concentrations have not been reducing at a statistically significant rate. Therefore, as a conservative approach, future year traffic data with baseline (2019) emission factors and baseline (2019) background concentrations has been used for the site suitability assessment as this gives a precautionary prediction of onsite concentrations.

Meteorological Data.

The model has been run using the full year of meteorological data corresponding to the most recent set of NO₂ monitoring data (2019). The meteorological data has been taken from the meteorological station located at Manchester Airport, a rural flat site located approximately 15 km south of the Application Site which has 86% data capture and is considered suitable for the area.

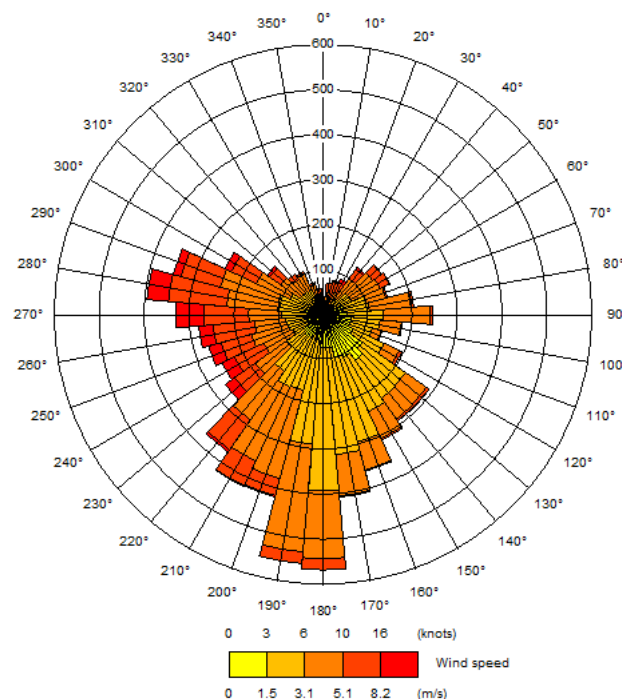


Figure 8: Windrose for Manchester Airport 2019

Verification

The verification process seeks to minimise uncertainties associated with the air quality model by comparing the model output with locally measured concentrations. The verification methodology is described in subsequent sections.

NO₂

Most NO₂ is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NO_x = NO + NO₂). The initial verification model has been run to predict the 2019 annual mean NO_x concentrations at the monitoring locations MA24NO, SA27NO, SA39NO and SA79NO.

The model output of road-NO_x has been compared with the 'measured' road-NO_x, calculated from the measured annual mean NO₂ concentrations and the background concentrations using the NO_x from NO₂ calculator v8.1 published by Defra.

The slope of the best-fit line between the 'measured' road-NO_x contribution and the model derived road-NO_x contribution, forced through zero, has been used to determine a primary adjustment factor. The initial results are displayed in Figure 9 below and Table 14 provides the inputs for the comparison of the adjusted modelled NO₂ and monitored NO₂, which are used to calculate the adjustment factor.

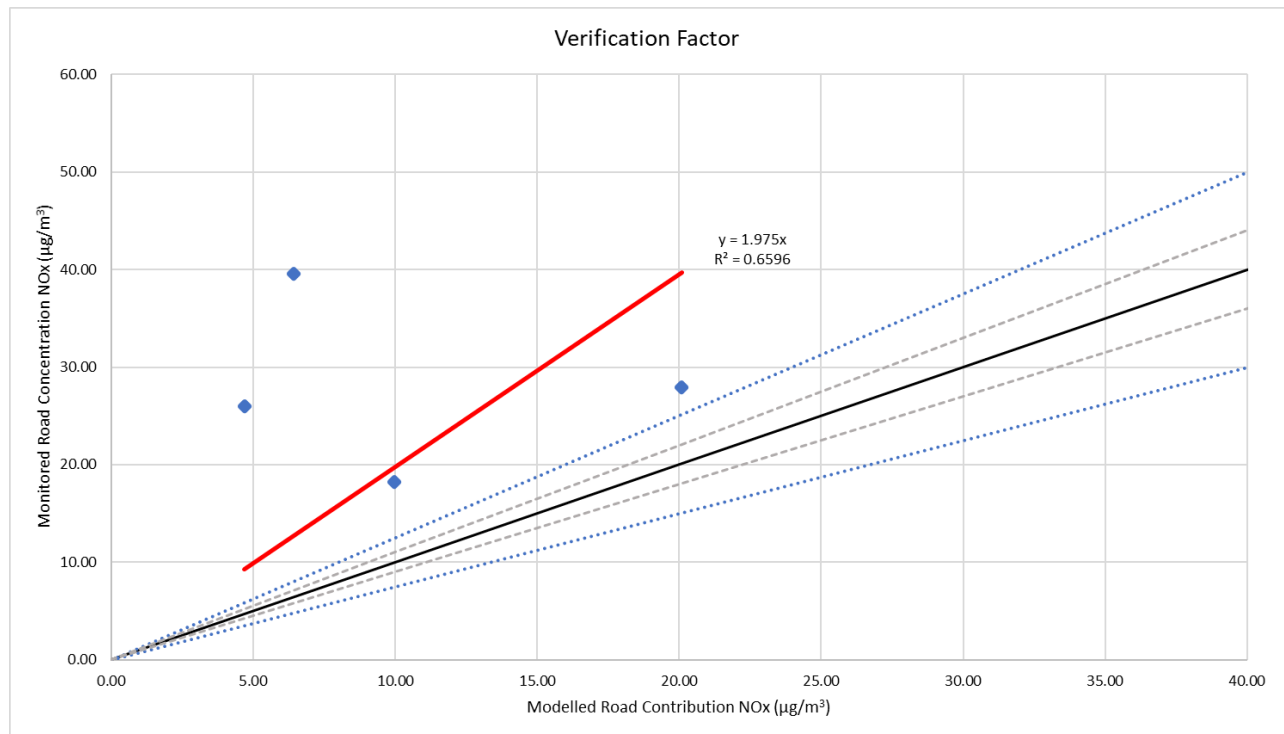


Figure 9: Initial Comparison of Measured Road NO_x to Unadjusted Modelled Road NO_x Concentrations

Table 14: Comparison of Modelled and Monitored NO₂ Concentrations

Monitoring Location	Modelled NO _x Road Contribution (µg/m³)	Monitored NO _x Road Contribution (µg/m³)	Adjusted Modelled NO _x Road Contribution (µg/m³)	Monitored Total NO ₂ Concentration (µg/m³)	Adjusted Modelled Total NO ₂ Concentration (µg/m³)	Difference (%)
MA24NO	4.69	25.96	9.27	40.80	32.87	-19.44
SA27NO	9.98	18.23	19.71	37.20	37.90	1.88
SA39NO	20.09	27.94	39.69	41.70	46.90	12.47
SA79NO	6.42	39.55	12.68	41.10	28.47	-30.73
Adjustment Factor	1.98					

As can be seen from Figure 9 and Table 14, there are two distinct verification domains, with the monitoring locations MA24NO and SA79NO underpredicting by 20-30%. Therefore, the adjustment factor of 1.98 was not considered suitable for the assessment. Modelling inputs were scrutinised, and no further improvement of the modelled results could reasonably be obtained. The meteorological data for 2019 for Manchester Airport has a

strong predominantly southerly wind direction, as illustrated in Figure 8, which is influencing the concentrations reported south of the modelled carriageway, leading to underpredictions at these locations. As the Application Site is located north of the modelled carriageway, it was therefore concluded that the monitoring locations SA27NO and SA39NO were the most representative of the Application Site and preferred for verification purposes.

Therefore, verification was undertaken with SA27NO and SA39NO in order to improve confidence in the modelled results. The results are displayed in Figure 9 below and Table 14 provides the inputs for the comparison of the adjusted modelled NO₂ and monitored NO₂, which are used to calculate the adjustment factor.

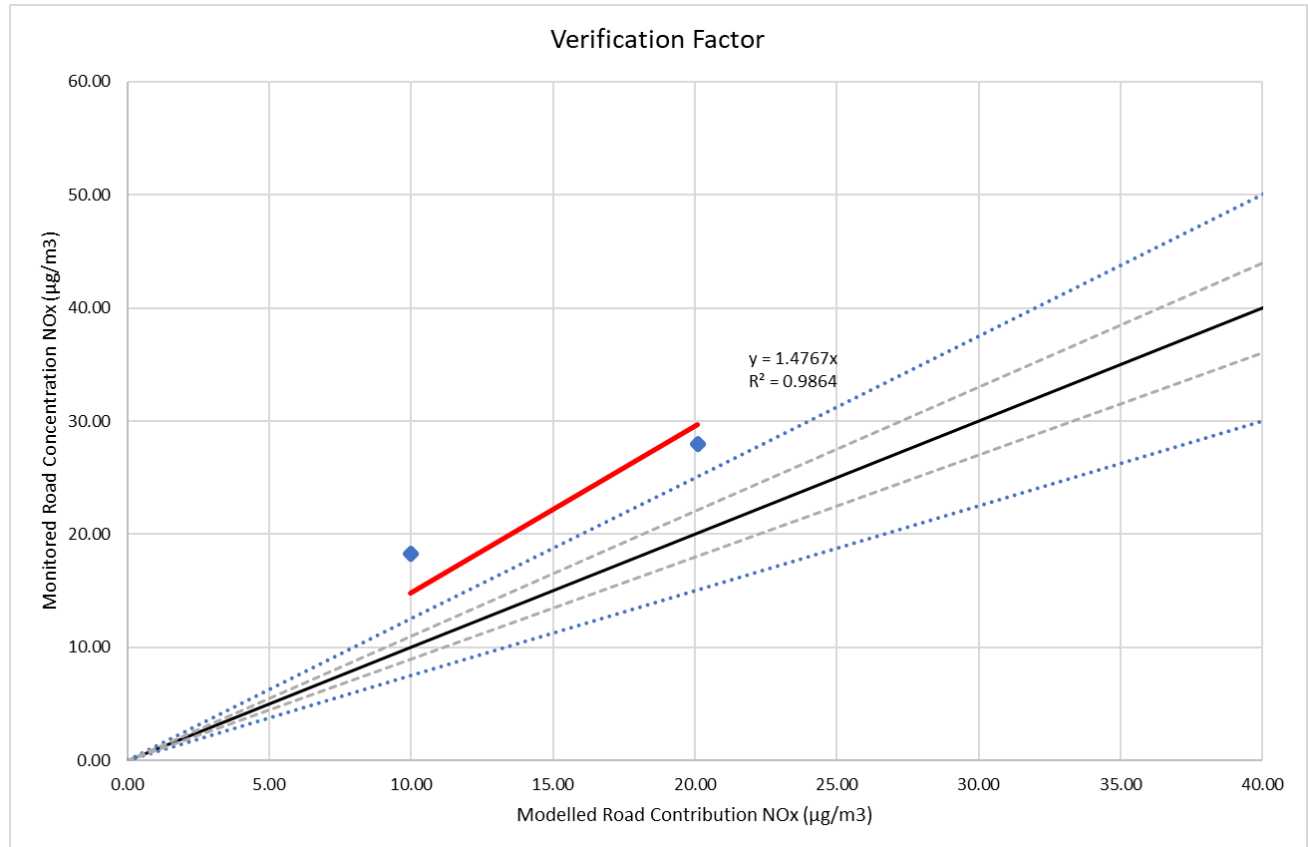


Figure 10: Initial Comparison of Measured Road NO_x to Unadjusted Modelled Road NO_x Concentrations

Table 15: Comparison of Modelled and Monitored NO₂ Concentrations

Monitoring Location	Modelled NO _x Road Contribution (µg/m³)	Monitored NO _x Road Contribution (µg/m³)	Adjusted Modelled NO _x Road Contribution (µg/m³)	Monitored Total NO ₂ Concentration (µg/m³)	Adjusted Modelled Total NO ₂ Concentration (µg/m³)	Difference (%)
SA27NO	9.98	18.23	14.74	37.20	35.53	-4.49
SA39NO	20.09	27.94	29.67	41.70	42.49	1.89
Adjustment Factor	1.48					

This factor has then been applied to the modelled road-NO_x concentration for each proposed receptor to provide adjusted modelled road-NO_x concentrations. The NO_x to NO₂ calculator has then been used to determine total NO₂ concentrations from the adjusted modelled road-NO_x concentrations and the background NO₂ concentrations.

The following adjustment factor has been applied to all modelled nitrogen dioxide data:

Primary verification factor: 1.48

The results imply that the model has under-predicted the road-NO_x contribution. This is a common experience with this and most other models.

Statistical Analysis of Model Performance

LAQM.TG22 recommends three statistical procedures that should be applied to evaluate model performance and assess the overall uncertainty. These are:

- Root mean square error (RMSE) defines the average error or uncertainty of the model. Ideally a RMSE within 10% of the air quality objective which is being assessed would be derived (for the annual mean NO₂ objective the ideal RMSE would be < 4 µg/m³). Where the RMSE is greater than 25% of the objective being assessed (i.e. 10 µg/m³ for the annual mean NO₂ objective) it is advised to revisit the model parameters and verification;
- Fractional bias identifies whether the model has a tendency to under-predict (positive value) or over-predict (negative value). The ideal value is zero but may range from +2 to -2; and
- Correlation coefficient provides a measure of the linear relationship between modelled and measured data. Values range between zero (no relationship) and 1 (perfect relationship).

The values for each of these methods are provided in Table 16.

Table 16 Statistical analysis of model verification.

Method	Value
RMSE	1.31
Fractional Bias	0.0112
Correlation Coefficient	1.00

PM₁₀ and PM_{2.5}

There are two PM₁₀ monitors within the study area, MAN1 and MAN3, which also monitors PM_{2.5}. MAN1 is classified as a 'kerbside' site, which are not recommended for verification within LAQM.TG22 as they can lead to over-adjustment of modelling. Additionally, MAN3 is classified as an 'urban centre' location, which is not representative of the conditions at the Application Site, and therefore is not considered appropriate for verification. Therefore, the model outputs of road-PM have been adjusted by applying the primary adjustment factor calculated for road NO_x in line with LAQM.TG22. As this has not identified any exceedances of the relevant AQOs, monitoring to confirm the findings is not required.

Appendix 3 – Professional Experience.

Kathryn Woolley (Hoare Lea), BSc (Hons), AMIEnvSc, MIAQM

Kathryn is an Associate Air Quality Consultant with Hoare Lea. She's is an associate Member of the Institution of Environmental Sciences and a Full Member of the Institute of Air Quality Management.

She has a diverse portfolio of experience and has worked on a range of projects from initial site feasibility, through planning and development to construction and operation. Kathryn's expertise covers planning, and air quality, specifically in relation to residential developments, industrial fixed installations such as district heating networks. Kathryn has completed over 50 EIA in the past 9 years throughout the UK and abroad including; St Johns Masterplan in Manchester (residential led), Leicester City Football club training facility north of Leister (sports use), 1-5 Grosvenor Place, Westminster (mixed use residential, retail and hotel site), and Chestnut Avenue in Eastleigh (residential and community use).

Chris Rush (Hoare Lea), BSc (Hons), MSc, PG Dip Acoustics, CEnv, MIOA, MIEMA, MIEEnvSc, MIAQM

Chris is an Associate Director Air Quality Consultant with Hoare Lea. He is a Chartered Environmentalist, a Member of the Institute of Acoustics, a Full Member of the Institute of Environmental Management and Assessment, a Member of the Institution of Environmental Sciences and a Full Member of the Institute of Air Quality Management (IAQM).

He has a diverse portfolio of experience and has worked on a range of projects from initial site feasibility, through planning and development to construction and operation. Chris's expertise covers planning, noise and air quality, specifically in relation to residential developments, industrial fixed installations such as waste management centres and transportation environmental impact on developments including air traffic. Chris is involved in the testing and assessment of the impact of indoor air quality and how building design contributes to this. He also is a member of Chartered Institute of Building Services Engineers (CIBSE) Air Quality Working Group and a committee member of the IAQM.

Andy Day (Hoare Lea), BSc (Hons), MSc, AMIEnvSc, AMIAQM

Andy is an Air Quality Consultant with Hoare Lea. He is a Member of the Institute of Environmental Sciences and an Associate Member of the Institute of Air Quality Management. He is a chemistry graduate with a Master's specialising in the catalysed removal of harmful volatile organic compounds (VOCs) often generated from the combustion of fuel in car engines.

Andy has worked on a range of projects of varying size across a number of different sectors. His experience focusses on work up to and through planning for air quality assessments and environmental impact assessments. Andy also has experience in detailed dispersion modelling of road traffic and energy combustion plant, emission mitigation statements, damage cost calculations, indoor and outdoor air quality monitoring and assessing the air quality impact at ecologically sensitive sites.

Andy has a particular interest in reducing emissions for the benefit of human health and the environment through the life cycle of a building.

Phoebe Stockton (Hoare Lea), BSc (Hons), MSc (Hons), AMIEnvSc, AMIAQM

Phoebe is an Air Quality Consultant at Hoare Lea, with 3 years' experience in air quality consultancy. She is a Biology graduate with a MSc in Environmental Engineering from Newcastle University. Phoebe has worked on a range of projects across the public and private sector, including extensive atmospheric dispersion modelling for input to Local Authority's Local Plans and Air Quality Action Plans. She also has experience in construction dust monitoring for large developments in Central London and preparation of air quality assessments for planning. Phoebe has provided input to Local Air Quality Management Guidance such as TG(16) and PG(16), and has experience in assisting Local Authorities to complete their Annual Status / Progress Reports. Phoebe's interests lie in the effects that pollution has on human health and wellbeing.



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