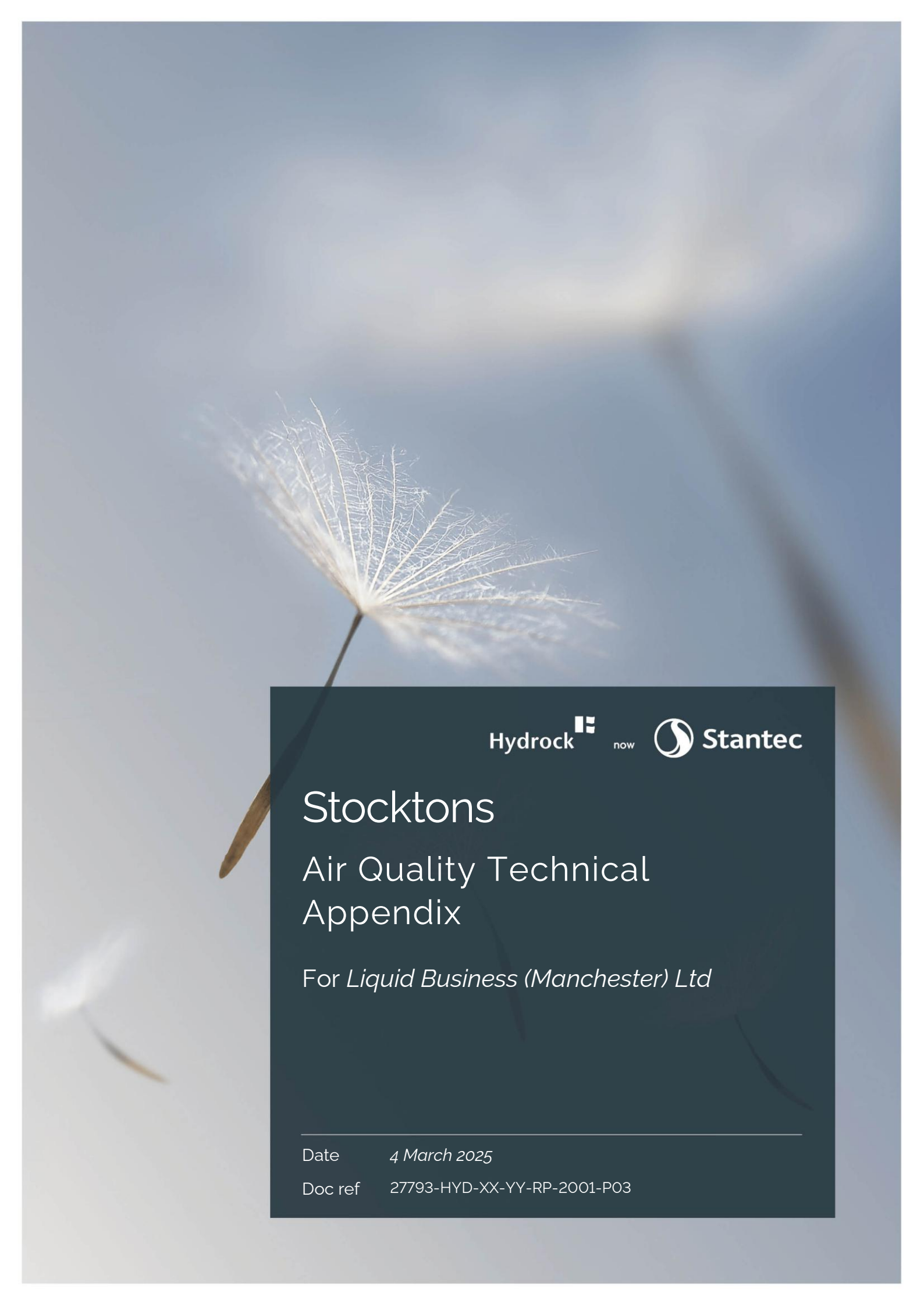




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Air Quality Technical Appendix

For Liquid Business (Manchester) Ltd

Date 4 March 2025

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1. Introduction

Hydrock, now Stantec have been commissioned by Liquid Business (Manchester) Limited (the 'Applicant') to prepare an Air Quality Assessment (AQA) to support the full planning application for a residential development (the 'Proposed Development') known as Stocktons, Manchester (the 'Site'). The Site is within the administrative boundary of Manchester City Council (MCC) and is centred on the approximate National Grid Reference (NGR); x385125 y398245, as shown in Figure 1.

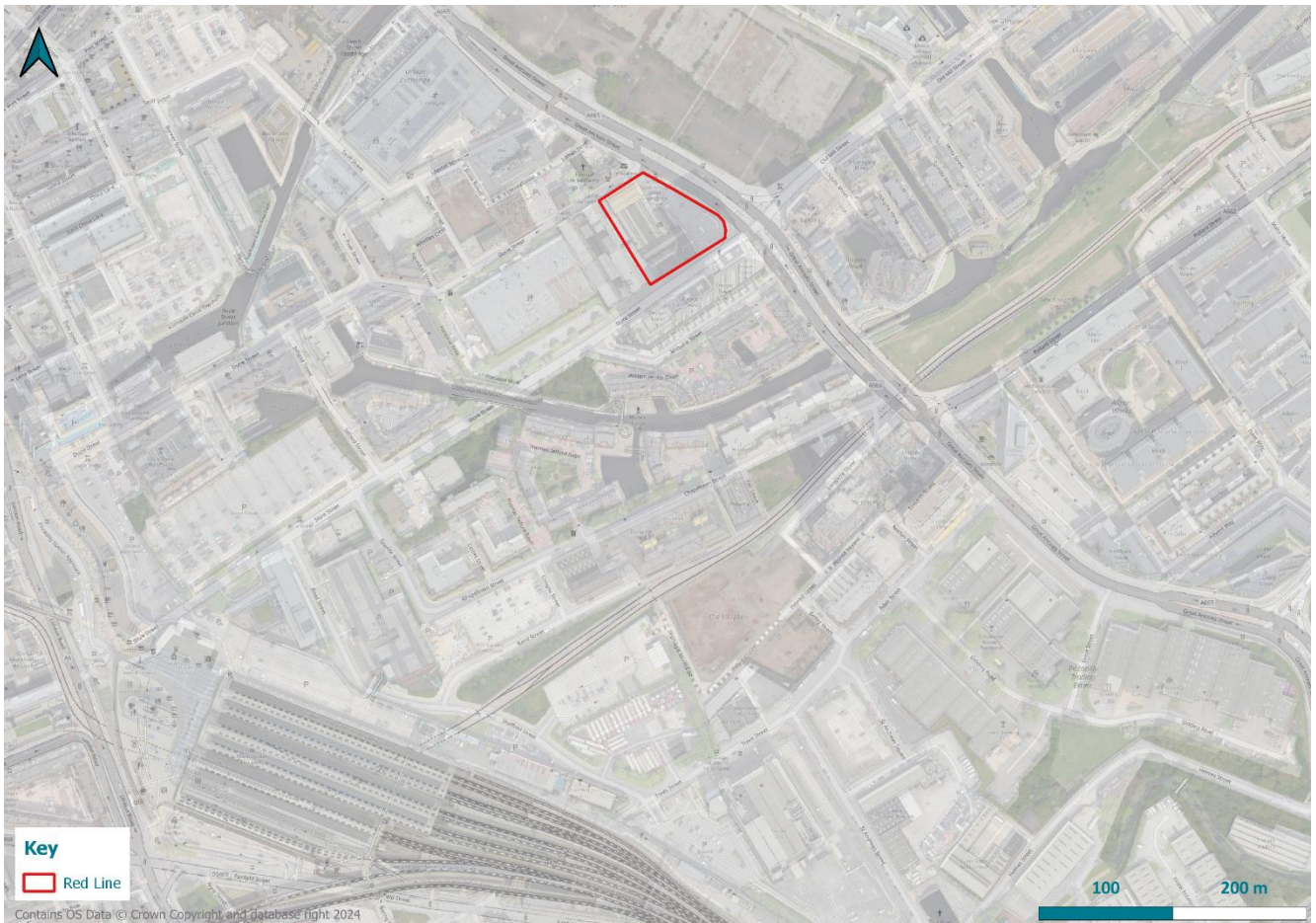


Figure 1: Site Location

The Site is located in the centre of Manchester. The Site currently comprises warehousing and commercial uses which are proposed to be demolished. Great Ancoats Street is located adjacent to the north eastern Site boundary beyond which is Cotton Field park and associated residential, commercial and office buildings. To the south beyond Store Street are residential apartments and dwellings and the Ashton Canal. To the north beyond Ducie Street are a mixture of residential commercial and office uses.

1.1 Proposed Development

The Proposed Development will comprise:

'Full planning permission for the demolition of existing buildings and erection of 2no. new buildings providing up to 758 apartments (Use Class C3), Class E floorspace (comprising flexible office accommodation (Use Class Eg(ii)) and Class Ea and b) and associated hard and soft landscaping (including works within the public highway), formation of vehicle accesses and servicing access together with associated works'

1.2 Purpose of Air Quality Assessment

The assessment describes relevant legislation, the assessment methodology and the baseline conditions currently existing in the area. It then presents an assessment of potential impacts during the construction and operational phases of the Proposed Development, and an evaluation of the significance of these effects with respect to air quality.

2. Relevant Legislation and Policy

2.1 Air Quality Regulations and Objectives

There are two sets of air quality legislation which include ambient air quality thresholds for the protection of public health that apply in England, these include legally binding limit values originally set by the European Union (EU) Directive 2008/50/EC¹ on ambient air quality and cleaner air for Europe; and regulations implementing national air quality objectives as set out in the 2023 Air Quality Strategy for England (AQS)² which local authorities are required to work towards achieving.

The EU (Withdrawal Agreement) Act 2020 sets out arrangement for implementing air quality limit values that are included in the EU Directive on ambient air quality and cleaner air for Europe (2008/50/EC) included in the following:

- » Air Quality Regulations (SI 2010 No.1001)³ and amended (SI 2016 No.1184)⁴;
- » The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (SI 2019 74)⁵;
- » The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (SI 2020 1313)⁶ amend the Air Quality Regulations (SI 2010 No.1001) to account for EU withdrawal; and
- » The AQS objectives are implemented in the Air Quality (England) Regulations 2000 (SI 2000/928)⁷ and Air Quality (England) (Amendment) Regulations 2002 (SI 2002/3043)⁸.

The 2023 AQS sets out the government's policies and framework for improving air quality in England with the aim of meeting the requirements of above legislation. The AQS also outlines the Limit Values, Target Values, Standards, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed AQALs throughout this report). The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023⁹ also brought forward a new target level for PM_{2.5}. Those relevant to this assessment is provided below, in Table 1:

Table 1: National AQALs

Pollutant	Averaging Period	AQALs	
NO ₂	1 Hour Mean	200µg/m ³	Not to be exceeded more than 18 times in a year.
	Annual Mean	40µg/m ³	
PM ₁₀	24 Hour Mean	50µg/m ³	Not to be exceeded more than 35 times in a year.
	Annual Mean	40µg/m ³	
PM _{2.5}	Annual Mean	20µg/m ³	

¹ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe Available at: <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32008L0050>

² Defra. "The Air Quality Strategy for England, Scotland, Wales and Northern Ireland". Available at: <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england>

³ The National Archives. "The Air Quality Standards Regulations 2010". Available at: <http://www.legislation.gov.uk/uksi/2010/1001/contents/made>

⁴ The National Archives (2016). "The Air Quality Standards (Amendment) Regulations 2016". Available at: <https://www.legislation.gov.uk/uksi/2016/1184/contents/made>

⁵ The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (legislation.gov.uk). Available at: <https://www.legislation.gov.uk/uksi/2019/74/contents/made>

⁶ The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (legislation.gov.uk). Available at: <https://www.legislation.gov.uk/uksi/2020/1313/contents/made>

⁷ The National Archives. "The Air Quality (England) Regulations 2000". Available at: <http://www.legislation.gov.uk/uksi/2000/928/contents/made>

⁸ The National Archives. "The Air Quality (England) (Amended) Regulations 2002". Available at: <http://www.legislation.gov.uk/uksi/2002/3043/contents>

⁹ <https://www.legislation.gov.uk/uksi/2023/96/contents/made>

Pollutant	Averaging Period	AQALs	
	Annual Mean Concentration Target (AMCT)	10µg/m ³	To be met across England by 2040
	-	Population Exposure Reduction Target ('exposure target')	35% reduction in population exposure by 2040 (compared to a base year of 2018).

With regards to PM_{2.5} Defra is currently developing new guidance to ensure the AMCT for PM_{2.5} is appropriately assessed. While achievement of the targets will be assessed at relevant monitoring sites, the targets apply to ambient (outdoor) air throughout England. Applicants and Local Planning Authorities should therefore consider the impact of developments on air quality in all ambient air.

Defra's Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22))¹⁰ provides guidance on where the above AQAL's should apply. This is summarised below, in Table 2.

Table 2: Summary of where AQALs should apply

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to other locations at the building façade) or any other location where public exposure is expected to be short term.
24 Hour Mean and 8 Hour Mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to other locations at the building façade) or any other location where public exposure is expected to be short term.

¹⁰ Defra, "LAQM Technical Guidance (TG22)" (Department for Food, Environment and Rural Affairs (Defra), August 2022), <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
1 Hour Mean	All locations where the annual Mean and: 24 and 8-hour mean objectives apply. Kerbside site (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railways stations etc. which are not fully enclosed, where members of the public might be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expect to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15 Minute Mean	All locations where member of the public might reasonably be exposed for a period of 15 minutes	

2.2 Local Air Quality Management

Obligations under the Environment Act 2021¹¹ (which provides an amendment to the Environment Act 1995¹²) requires local authorities to review and assess air quality in their administrative boundaries. Where AQALs are predicted to be exceeded, the local authority must declare an Air Quality Management Area (AQMA) at sensitive receptor locations and formulate an Air Quality Action Plan (AQAP) to reduce pollution concentrations to values below AQALs.

MCC's declared AQMAs and AQAP are discussed in Section 4.1.

2.3 National Planning Policy Framework

The National Planning Policy Framework (NPPF)¹³ sets out the Government's planning policy for England. It requires planning decisions for any new development to prevent new and existing development from contributing to, or being put at risk from, unacceptable levels of air pollution (paragraph 187). It also states that planning decisions should sustain and contribute towards compliance with relevant limit values or national objectives for air pollutants, taking into account the presence of AQMAs and Clean Air Zones (CAZ)s (paragraph 199), and the cumulative impacts from other sites (paragraph 198).

¹¹ <https://bills.parliament.uk/bills/2593/publications>

¹² Environment Agency, "Environment Act 1995" (The Environment Agency, 2002), <http://www.legislation.gov.uk/ukpga/1995/25/contents>.

¹³ Department for Levelling Up, Housing & Communities. National Planning Policy Framework (December, 2024). [online] Available: <https://assets.publishing.service.gov.uk/media/675abd214cbda57cadd3476e/NPPF-December-2024.pdf>

Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. Furthermore, planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan.

Also, to help reduce congestion and emissions, to improve air quality and public health, significant development should be focused on locations which are / can be made sustainable through limiting the need to travel (paragraph 110).

2.4 Planning Practice Guidance

Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG)¹⁴, which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality. The NPPG summarises the importance of air quality in planning and the key legislation relating to it.

2.5 Local Planning Policy

The Manchester Local Plan guides development within Manchester. The Core Strategy¹⁵ was adopted on 11th July 2012 and is the key document in the Manchester Local Plan. It sets out the long-term strategic policies for future development in Manchester. Within the Core Strategy Policy EN16 relates to air quality as follows:

"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 development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas"

The Core Strategy goes further in stating that:

"Whilst this policy seeks to improve air quality within Manchester's AQMA it also applies across the District in order to assist air quality across Manchester remaining at acceptable levels. It should be noted that other policies within the Core Strategy will guide the location of development in order to reduce the need for private transport and encourage the use of decentralised and renewable energy and green infrastructure to reduce both emissions and their impact still further."

Policy DM 1 'Development Management' also includes a reference to air quality, stating that:

"all development should have regard to effects on amenity, including air quality".

The GMCA adopted their Places for Everyone Plan¹⁶ on 21st March 2024. Places for Everyone is a long-term plan of nine Greater Manchester districts for jobs, new homes, and sustainable growth up to 2039. The following policy relates to air quality:

"Policy JP-S5

¹⁴ Ministry of Housing, Communities & Local Government, "Reference ID (32) Air Quality" (Ministry of Housing, Communities & Local Government, 2023), <https://www.gov.uk/guidance/air-quality--3>.

¹⁵ Manchester City Council, "Manchester's Local Development Framework, Core Strategy Development Plan Document, July 2012, Core Strategy | Manchester City Council

¹⁶ <https://www.greatermanchester-ca.gov.uk/media/9578/places-for-everyone-joint-development-plan-document.pdf>

Clean Air

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

- 1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;*
- 2. Determining planning applications in accordance with the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;*
- 3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air quality can be fully assessed and development only permitted where they are acceptable and/or suitable mitigation can be provided;*
- 4. Restricting and carefully regulating developments that would generate significant point source pollution such as some types of industrial activity and energy generation;*
- 5. Significantly expanding the network of electric vehicle charging points, both for public and private use, including as part of new developments;*
- 6. Implementing the Clean Air Plan and associated measures;*
- 7. Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;*
- 8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;*
- 9. Controlling traffic and parking within and around schools, early years sites and other locations that are particularly sensitive to air quality;*
- 10. Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and*
- 11. Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users."*

3. Methodology

3.1 Consultation

Full details of the AQA approach were sent to MCC Environmental Health Officer (EHO) on 17th September 2024. The following response was received:

"I have reviewed your methodology and it's fine. I look forward to reviewing the report when it is submitted with the planning application."

The agreed scope of works is detailed below.

3.2 Guidance

The following guidance has been used to undertake this AQA:

- » Defra's LAQM.TG(22)¹⁰;
- » EPUK & IAQM Land-use Planning & Development Control: Planning for Air Quality¹⁷;
- » The IAQM's guidance on assessing impacts from construction¹⁸; and
- » MCC's Air Quality & Planning Technical Guidance¹⁹.

3.3 Baseline Air Quality

The baseline air quality conditions in the vicinity of the Site have been established through the compilation and review of the following sources. The baseline assessment can be found in Section 4.

- » Data from the National Atmospheric Emissions Inventory (NAEI)²⁰, Environment Agency (EA)²¹ and Defra's Pollutant Release and Transfer Register (PRTR) data²²;
- » Defra's modelled background concentrations of AQS pollutants (UK-AIR)²³. These estimates are produced using detailed modelling tools and are available as concentrations at central 1km² National Grid square locations across the UK. Mapped background concentrations have been obtained based upon the 2018 base year Defra update (August 2020 publication);
- » Multi Agency Geographic Information for the Countryside (MAGIC)²⁴, which incorporates Natural England's interactive maps and;
- » MCC's latest available air quality monitoring data, derived from the latest available air quality annual status report published in 2023²⁵. 2023 data for monitoring locations has been sourced from Clean Air for Greater Manchester website²⁶.

¹⁷ EPUK & IAQM, "Land-Use Planning & Development Control: Planning for Air Quality" (Institute for Air Quality Management (IAQM), January 2017), <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>.

¹⁸ IAQM, "Guidance on the Assessment of Dust from Demolition and Construction" (Institute of Air Quality Management (IAQM)), January 2024 version 2.2), <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf>.

¹⁹ Manchester City Council, Air Quality & Planning Technical Guidance, August 2022, https://www.manchester.gov.uk/downloads/download/5199/information_for_developers.

²⁰ National Atmospheric Emissions Inventory, UK Emissions Interactive Map (beis.gov.uk).

²¹ <https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory>

²² UK Pollutant Release and Transfer Register (PRTR) <https://prtr.defra.gov.uk/map-search>

²³ UK-AIR, "Background Mapping Data for Local Authorities - 2018," n.d., <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

²⁴ <https://magic.defra.gov.uk/MagicMap.aspx>

²⁵ Greater Manchester Combined Authority, 2023 Air Quality Annual Status Report (ASR). In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, June 2023.

²⁶ <https://cleanaigm.com/data-hub/>

3.4 Construction Phase Assessment

3.4.1 Dust Risk Assessment

The construction dust risk assessment is provided in Section 5 and has been undertaken in line with IAQM guidance¹⁸. This considers the risk of impacts during the construction phase in terms of nuisance dust, human health (PM₁₀ exposure) and ecological impacts.

With regard to ecological receptors, risk assessment should be taken where high-sensitivity receptors are located within 50m of a Site boundary, or within 50m of any routes used by construction vehicles on the public highway, up to 250m from the Site entrance. The MAGIC website²⁴ has been reviewed to identify whether any statutory ecological sensitive receptors present in the area. *No receptors were identified within 50m of the Site boundary or expected Trackout route and therefore no further consideration of ecological receptors is required.*

Sensitive human receptors were identified within 250m of the Site boundary. Based on the IAQM guidance residential dwellings, museums, car parks and car show room are indicative examples of high sensitivity receptors in relation to both dust soiling and health effects of PM₁₀. Indicative examples of medium sensitivity receptors include places of work, such as offices.

The IAQM guidance states that the potential dust emission magnitude from Demolition, Earthworks, Construction and Trackout should all be assessed individually. In addition, the sensitivity of the area to adverse dust impacts should also be defined.

The overall significance of the risk of adverse impacts during the construction phase can then be defined using the 'risk of impacts matrix' for each stage of the construction phase described above.

3.4.2 Construction Traffic Emissions

The IAQM guidance states that from experience of assessing exhaust emissions from site traffic, it is unlikely that any significant adverse impacts on local air quality would be caused and in the vast majority of cases, quantitative assessment is not needed. As such, short term effects of construction traffic emissions have not been assessed, as they are also likely to be well below the EPUK & IAQM traffic criteria outlined in Table 3.

3.5 Operational Phase Assessment

3.5.1 Scope of Impact Assessment

The scope of assessment has been determined against the EPUK and IAQM's two stage checklist criteria¹⁷ which is also stated within the MCC Air Quality & Planning Technical Guidance¹⁹. The Proposed Development meets the Stage 1 Criteria for requiring an AQA and accordingly, has been considered against the relevant Stage 2 checklist criteria shown in Table 3 which identifies whether a detailed assessment of potential air quality impacts is required.

Stage 2 includes some criteria which are not directly relevant to the Proposed Development, such as those related to the realignment of roads within an AQMA, introduction of a new bus station, new road junctions and underground car parks. These have been excluded from this assessment and only relevant screening criteria have been included.

Table 3: EPUK & IAQM Assessment Criteria

Criteria	The Development Will:	Indicative Criteria to Proceed to a Detailed AQA:
1	Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV - cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: » more than 100 AADT within or adjacent to an AQMA » more than 500 AADT elsewhere
2	Cause a significant change in Heavy Duty (HDV) flows on local roads with relevant receptors (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: » more than 25 AADT within or adjacent to an AQMA » more than 100 AADT elsewhere.
3	Have one of more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. This includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NOx emission rate is less than 5mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situation where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emissions rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

As the Site is located within the Greater Manchester Combined Authority (GMCA) AQMA, the more stringent criteria from Table 3 apply. Vectos, the transport consultants, have confirmed the Proposed Development is anticipated to generate vehicle trips below the threshold once dispersed and therefore detailed assessment of operational phase air quality impacts at existing receptors has been scoped out. Further analysis is undertaken in Section 6.

However, as the Proposed Development will introduce new high sensitivity receptors into an AQMA, a detailed assessment of occupant exposure has been undertaken, which was agreed with the EHO at MCC.

While operational phase impacts have been screened in line with the EPUK & IAQM guidance and MCC guidance, due to the size of the Proposed Development, in line with the MCC guidance it is considered good practice that a Damage Cost Calculation is undertaken, otherwise known as an Emissions Mitigation Assessment. This can be found in Section 7.

FutureServ, the MEP consultants, have confirmed the following with regards to the energy strategy for the Proposed Development:

" - fabric first approach;

- all electric in terms of fuel to take advantage of the current grid carbon intensity, with use of Air Source Heat Pumps (ASHP) and Photo Voltics (PV);

- commercial areas will be ASHP based in terms of central plant serving hot water and heating;

- residential areas will utilise de-centralised ASHPs within each dwelling to serve hot water;

- PV will be used on both buildings to ensure Part L compliance, offset electricity use, and provide sufficient renewable technology;

- mechanical ventilation with heat recovery (MVHR) will be provided to all dwellings, and commercial areas;

- LED lighting with efficacy above 100 lumens / circuit wattage will be used throughout; and

- efficient and intelligent control systems will be applied to all commercial and landlords areas to ensure energy usage is limited to when required "

Therefore, the Site will not utilise combustion as part of its design and no further assessment has been undertaken on this basis.

3.5.2 ADMS-Urban Dispersion Model

A detailed AQA has been undertaken using the air dispersion model ADMS-Urban v5.0.1 to establish the current and future air quality conditions in the area. The software is commercially available, has been validated for this type of assessment by Defra and is used extensively for AQA's.

ADMS-Urban is able to provide an estimate of air quality both before and after development, considering important input data such as background pollutant concentrations, variable emissions, meteorological data, and traffic flows.

3.5.3 Assessment Scenarios

The following scenarios have been modelled:

- » Baseline/verification 2023;
- » 2031 Do Something (DS) – 2023 flows (considered representative of opening year) in addition to operational traffic flows associated with the Proposed Development.

3.5.4 Model Inputs

3.5.4.1 Traffic Data

The traffic data for the dispersion modelling has been provided by the appointed Transport Consultants on the project, SLR. Additionally, the 2023 baseline traffic data comprises AADT flows sourced from the Department for Transport (DfT)²⁷, which contains traffic flows for all motorways and major A-roads throughout the UK. The following count points have been used within this AQA:

- » Great Ancoats Street, DfT count point 47457; and

²⁷ Map Road traffic statistics - Road traffic statistics (dft.gov.uk).

- » Great Ancoats Street (east of A662), DfT count point 7857.

The Transport Consultants, SLR Consulting, have produced a Technical Memorandum with regards to the application of Traffic growth in Manchester. The Technical Memorandum can be viewed in Appendix A. The Technical Memorandum concludes:

"[...] over 20 years traffic has been falling by around 10,000 vehicles coming into the City Centre. For this reason, it is not appropriate to apply future year growth to traffic flows within the city centre and that it is reasonable to assume that existing flows will not increase in the future."

As such, 2023 base traffic has not had an opening year growth factor applied and is considered a robust traffic count for 2028.

The traffic data comprises Annual Average Daily Traffic (AADT) flows with traffic split by Heavy Duty Vehicles (HDVs) and Light Duty Vehicles (LDVs). The modelled road links are shown in Figure 1 below, with full details provided in Appendix A.



Figure 1: Links Modelled

For each road link, vehicle speeds were obtained from the speed limit for each road derived from the OpenStreet Browser v4.10²⁸, which has been used as a proxy for average speeds on the network. Vehicle speeds were reduced within approximately 50m of junctions relative to the speed limit to account for

²⁸ https://www.openstreetbrowser.org/#map=15/53.7033/-1.2698&categories=car_maxspeed

queuing and congestion in the average speed profile, in accordance with LAQM.TG (22), and based on professional judgement.

3.5.4.2 Emission Factors

Emission rates for NO_x, PM₁₀ and PM_{2.5} used for the dispersion modelling assessment were calculated from the latest Emissions Factor Toolkit (EFT)(v.12.1).

Most modern vehicles on the road in the UK meet a particular Euro emissions standard from 1 – 6, with 6 being the newest. Different parts of the country have newer or older vehicles than others. This is defined as the “fleet”. The EFT estimates this primarily based on whether the location is within or outside London or in England, Wales or Scotland. In the case of this model the vehicle fleet used was “England (urban)”.

When predicting future year emissions, the toolkit includes forecasts such as anticipated advances in vehicle technology and changes in vehicle fleet composition, which assumes that vehicle emissions will reduce over time.

3.5.4.3 Background Concentrations

Reference should be made to Section 4.4 for the background concentrations utilised within the model.

3.5.4.4 Temporal Variation (Diurnal Traffic Profile)

Temporal variation in traffic flows along roads have been included in the dispersion model to account for the realistic differences that would occur between weekdays and weekends. Accordingly, a time varying profile was included in the model.

The diurnal profile used in the model has been calculated based on DfT Road traffic statistics (TRA) dataset. TRA0307 provides 'Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2023'²⁹, which shows the average hourly traffic flow in each combination of weekday and hour, relative to the average hour across the whole year for main roads in England. Figure 2 shows the diurnal traffic profile included in the model.

²⁹ DfT, "Average Annual Daily Flow and Temporal Traffic Distributions (TRA03) - Statistical Data Sets - GOV.UK," 2015, <https://www.gov.uk/government/statistical-data-sets/tra03-motor-vehicle-flow>.

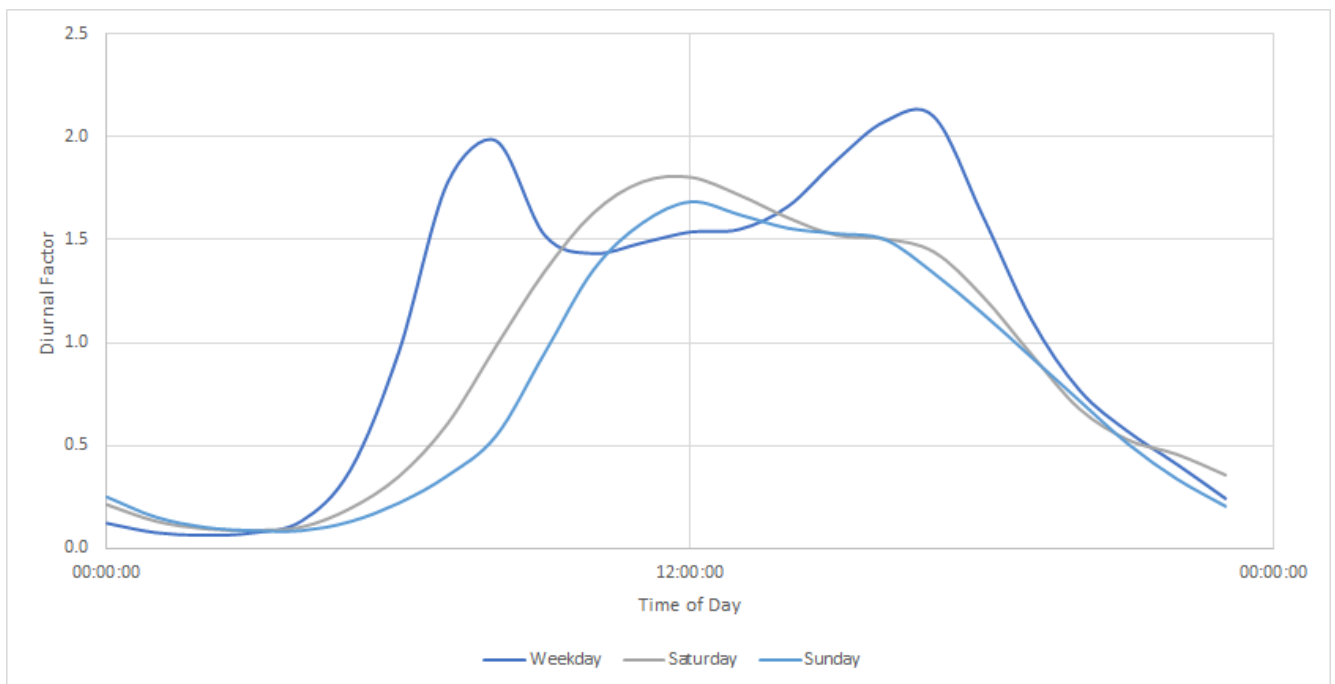


Figure 2: Diurnal Traffic Profile Included in the Dispersion Model

3.5.4.5 Meteorological Parameters

To calculate pollutant concentrations at identified sensitive receptor locations the dispersion model uses hourly sequential meteorological data, including wind direction, wind speed, temperature, cloud cover and stability, which exert significant influence over atmospheric dispersion.

The dispersion modelling has been undertaken using 2023 data from Manchester Airport Meteorological station. This site is located approximately 12.3km south of the Proposed Development. It is the most relevant meteorological station that records all of the parameters necessary for dispersion modelling. Missing data has been infilled using Rostherne No2 Meteorological station. A wind rose is presented in Appendix B.

3.1.1.1 Surface Characteristics

The following surface roughness parameters have been applied in the model:

- » Dispersion site surface roughness = 1.5m (ADMS pre-set 'large urban area');
- » Met site surface roughness = 0.02m (ADMS between pre-set 'open grassland');

The following Minimum Monin-Obukhov (MO) lengths were applied:

- » Dispersion site = 30m (ADMS preset 'cities and large towns');
- » Met site = 20m (Between ADMS preset 'cities and large towns' and 'small towns').

3.1.2 Receptors Included in the Dispersion Model

3.1.2.1 Human Receptors

Sensitive receptor locations included in the dispersion model are shown below in Figure 3 and Table 4. These are worst-case locations within the Site Boundary based upon their proximity to the modelled road network.

Locations have been determined using design drawings³⁰.

The height of each floor (Z) has been calculated using design drawings³¹. An additional 1.5m has been added to each floor to account for the breathing height of the proposed occupant.

Residential dwellings start at first floor within Block A and then continue at each floor. First, Second, Third and Fourth floor locations have been included within the model, with concentrations expected to decrease at additional heights. Within block B, residential dwellings begin at Fourth floor and therefore, only this floor has been modelled. In line with the London City Air Quality³² document, air quality improves with height (at roadside locations) up to the fourth floor of typical buildings. Beyond this a further reduction is minimal. As such, the heights modelled are considered worst-case.

Table 4: Receptor Locations

Receptor ID	Location	NGR (m)		Z (m)	Sensitivity
		X	Y		
Block B					
R01	Residential	385128	398277	19.3	High
R02	Residential	385121	398281	19.3	High
R03	Residential	385115	398284	19.3	High
R04	Residential	385110	398283	19.3	High
R05	Residential	385101	398277	19.3	High
R06	Residential	385090	398269	19.3	High
R07	Residential	385098	398254	19.3	High
Block A					
R08	Residential (1 st , 2 nd , 3 rd and 4 th Floor)	385145	398246	8.8, 12.5, 15.5, 18.4	High
R09	Residential (1 st , 2 nd , 3 rd and 4 th Floor)	385134	398242	8.8, 12.5, 15.5, 18.4	High
R10	Residential (1 st , 2 nd , 3 rd and 4 th Floor)	385127	398235	8.8, 12.5, 15.5, 18.4	High
R11	Residential (1 st , 2 nd , 3 rd and 4 th Floor)	385156	398227	8.8, 12.5, 15.5, 18.4	High
R12	Residential (1 st , 2 nd , 3 rd and 4 th Floor)	385147	398220	8.8, 12.5, 15.5, 18.4	High
R13	Residential (1 st , 2 nd , 3 rd and 4 th Floor)	385138	398216	8.8, 12.5, 15.5, 18.4	High
R14	Residential (2 nd , 3 rd and 4 th Floor)	385167	398254	12.5, 15.5, 18.4	High

³⁰ Block A - Simpson Haugh, Drawing No: 10359-SHP-Z1-A-G200-PL-01-001, General Arrangement - Level 01, 11/10/2024, Drawing No: 10359-SHP-Z1-A-G200-PL-02-001, General Arrangement - Level 01 and Block B - Simpson Haugh, Drawing No: 10359-SHP-Z2-A-G200-PL-04-001, General Arrangement - Level 04, 11/10/2024.

³¹ Block B - Simpson Haugh, Drawing No: 10359-SHP-Z2-A-G200-EL-NE-001, 27/9/2024.

³² CITY AIR QUALITY AT HEIGHT - Lessons for Developers & Planners, WSP and Parsons Brinkerhoff.

Receptor ID	Location	NGR (m)		Z (m)	Sensitivity
		X	Y		
R15	Residential (2 nd , 3 rd and 4 th Floor)	385173	398243	12.5, 15.5, 18.4	High
R16	Residential (2 nd , 3 rd and 4 th Floor)	385154	398250	12.5, 15.5, 18.4	High
R17	Residential (2 nd , 3 rd and 4 th Floor)	385163	398234	12.5, 15.5, 18.4	High

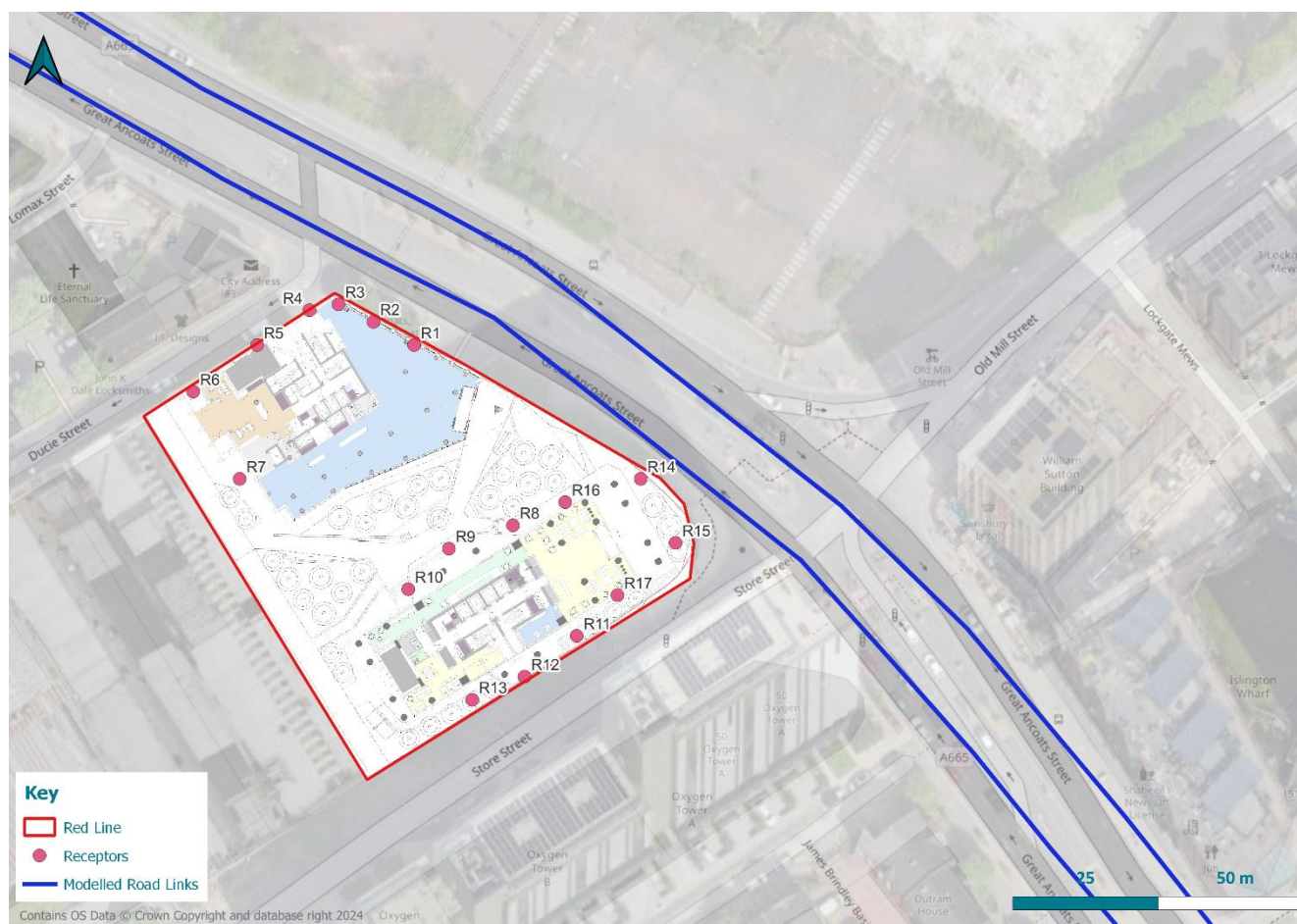


Figure 3: Receptor Locations

3.1.3 Model Verification

A verification study has been undertaken in accordance with LAQM.TG(22) using MCC monitoring data. An adjustment factor of **2.2939** was applied to modelled road NO_x concentrations.

Due to insufficient PM monitoring in the study area, the modelled road-PM₁₀ and road-PM_{2.5} components have been adjusted by the NO_x verification factor obtained before adding to the appropriate background concentration, in accordance with LAQM.TG(22). This approach is considered likely to provide a conservative estimate of the contribution of modelled roads to ambient PM₁₀ and PM_{2.5} concentrations.

Root Mean Square Error (RMSE) is used to define the average error or uncertainty of the model. LAQM.TG(22) states that the RMSE is acceptable where it is within 25% and ideal within 10%. The model verification process

calculated a post-adjusted RMSE of **8.0µg/m³**, which equates to **20.1%** of the annual mean AQAL for NO₂ and is therefore considered to be acceptable.

Full details of the model verification procedure are included in Appendix C.

3.1.1 Conversion Factors

3.1.1.1 NO_x to NO₂ Conversion

Ambient NO_x concentrations have been predicted through dispersion modelling. Annual NO_x concentrations have been converted using Defra's NO_x to NO₂ conversion tool³³ version 8.1.

3.1.1.2 1-hour mean NO₂

To determine short term (1-hour mean) concentrations, reference was made to LAQM.TG(22)¹⁰, which states if annual mean concentrations of NO₂ do not exceed 60µg/m³, it is unlikely hourly mean concentrations would exceed the relevant AQAL, which allows for 18 exceedances of the hourly standard (200µg/m³) in a calendar year.

3.1.1.3 Annual Mean Particulate Matter

To determine total annual mean concentrations of PM₁₀ and PM_{2.5}, the modelled road contribution was added to the background concentration to give the total concentration for comparison with the AQALs.

3.1.1.4 24-hour mean PM₁₀

Annual mean PM₁₀ concentrations were used to derive the potential number of exceedances of the 24-hour mean PM₁₀ AQAL, of which 35 are allowed per year. The method described in LAQM.TG(22) was applied, which is based on the relationship between the number of 24-hour exceedances of 50µg/m³ and the annual mean concentration. This relationship is described in Equation 1 below:

Equation 1 - Calculation of PM₁₀ 24-hour Mean Exceedances

$$\text{Number of exceedances of 24-hour mean of } 50\mu\text{g/m}^3 = -18.5 + 0.00145 \cdot a^3 + (206/a)$$

where 'a' = total annual mean PM₁₀ concentration.

3.2 Assessment of Significance of Exposure

Professional judgement has been applied to determine whether exposure to air pollution is significant or not, based on the following criteria:

- » Annual mean concentrations within 10% below or exceeding relevant AQAL = significant exposure; and
- » Annual mean concentrations more than 10% below relevant AQAL = not significant.

The 10% threshold around an AQAL is generally considered to be the range at which a 'risk of exceedance' is present, according to LAQM.TG(22)..

3.3 Model Limitations

There are inherent uncertainties associated with the model (ADMS Urban) used in this assessment, including uncertainties associated with the input data such as predicted traffic flows. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS model will not take into account. To account for uncertainty

³³ Defra, "NO_x to NO₂ Calculator" (Defra, 2019), <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc>.

in future emission factors and pollutant concentrations, the precautionary principle has been followed in the assessment, whereby:

- » Emission Factors held at 2023 (no future improvements assumed); and
- » Background pollutant concentrations held at 2023 (no future improvements assumed).

The above assumptions ensure a conservative approach in the assessment

4. Baseline Air Quality Conditions

4.1 Local Air Quality Management

The Greater Manchester AQMA has been declared by the GMCA of which MCC is one of the included Local Authorities. The Greater Manchester AQMA has been declared for exceedances of the annual mean NO₂ AQAL and covers "An Area covering the 10 districts of Greater Manchester, including arterial routes, district centres, and airport." The Proposed Development is located within the AQMA.

The GMCA have an AQAP³⁴ to help reduce pollutants within this designated area. Actions include, promoting sustainable transport including buses, cycling, providing resources to help raise awareness and educate and increased Electric Vehicle charging provision.

4.2 Clean Air Zone

The Proposed Development is located within the proposed Greater Manchester CAZ which is currently 'in review'. The Greater Manchester Air Quality Administration Committee are currently deciding whether to approve the Mayor of Greater Manchester proposals for an investment-led Clean Air Plan.

In relation to the GM Air Quality Plan, a section of Great Ancoats Street is an 'over the legal limit' road link in the vicinity of the Site³⁵, therefore the Proposed Development should ensure that compliance is not delayed as a result of emissions from additional traffic flows.

4.3 Local Emission Sources

The main source of air pollution in the surrounding Site locale is considered to be emissions from vehicles using the local road network, predominantly Great Ancoats Street to the north east, Ducie Street to the north west and tore Street to the south east.

A review of the NAEI²⁰, EA²¹ and Defra's PRTR²² data indicates that there are no major industrial pollution sources in the immediate vicinity of the Site that will influence local air quality.

4.4 Defra Mapped Concentrations

4.4.1 Background Concentrations

Background pollutant concentrations for 2023 (the base year), 2024 (the assessment year) and 2031 (the proposed opening year) are displayed in Table 5.

Data is only available up to 2030 and therefore this has been used for the 2031 opening year.

Table 5: Defra Mapped Background Concentrations

Grid Square (x,y)	Pollutant	AQAL (µg/m ³)	Annual Mean Concentration (µg/m ³)		
			2023	2024	2031
385500, 398500	NO ₂	40	20.3	19.7	17.5
	PM ₁₀	40	11.9	11.8	11.6
	PM _{2.5}	20	7.9	7.8	7.7

³⁴ GREATER MANCHESTER AIR QUALITY ACTION PLAN 2016–2021, <https://www.bing.com/search?q=GMCA+air+quality+action+plan&FORM=AWRE>

³⁵ GM Clean Air Plan Map | MappingGM, https://mappinggm.org.uk/clean-air-plan/#os_maps_light/10/53.5069/-2.3201

The data show that annual mean background concentrations of NO₂, PM₁₀ and PM_{2.5} at the grid squares within which the Site is located are below the AQALs in all years. Additionally, background PM_{2.5} is below the 2028 interim AMCT of 12µg/m³.

Concentrations of all pollutants are predicted to decline incrementally each year. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles and strategies to reduce emissions across all sectors.

To avoid double counting of potential source contributions already contained within the ADMS-Urban dispersion model, 'Trunk Road in' and 'Primary A Road in' sectors were removed from each grid square. All proposed receptors are located within the same grid square.

As the relationship between NO₂ and NO_x is not linear, the NO₂ Adjustment for NO_x Sector Removal Tool³⁶ has been used – in accordance with LAQM.TG(22).

Adjusted Defra UK-AIR modelled background concentrations from 2023 for relevant grid squares were considered to be the appropriate source of background concentrations in the dispersion model for the assessment of human health receptors. NO₂, PM₁₀ and PM_{2.5} backgrounds were derived from this data shown in Table 5 and are presented below.

Table 6: Adjusted 2023 Defra Mapped Background Concentrations

Grid Square (x,y)	Pollutant	AQAL (µg/m ³)	Adjusted 2023 Annual Mean Concentration (µg/m ³)
385500, 398500	NO ₂	40	19.7
	PM ₁₀	40	11.9
	PM _{2.5}	20	7.9

4.5 Air Quality Monitoring Data

The UK Automatic Urban and Rural Network (AURN) is a countrywide network of air quality monitoring stations operated on behalf of the Defra. Monitoring data for AURN sites is available from the UK Air website³⁷. The closest AURN monitor to the Site is over 10km north and therefore not considered representative of Site locations. As such, this monitoring network has not been considered further.

MCC monitor air quality at key locations across the City through a network of automatic (continuous) and non-automatic sites (passive diffusion tubes). The latest Annual Status Report²⁵ states that the monitoring network within Manchester consisted of 4 automatic monitors and 40 passive sites.

4.1.1 Automatic Monitoring

One of MCC's monitoring locations (MAN3) is considered representative of Site conditions. The location of MAN3 (x384310, y398337) is shown on Figure 4 and recent results are shown in Table 7.

³⁶ Defra NO₂ Adjustment for NO_x Sector Removal Tool version 7.0 (2018), available at <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxsector>.

³⁷ Automatic Urban and Rural Network (AURN) - Defra, UK

Table 7: Automatic Monitoring Results

Monitor	Pollutant	AQAL ($\mu\text{g}/\text{m}^3$)		Concentration ($\mu\text{g}/\text{m}^3$)				
				2019	2020	2021	2022	2023
MAN3 Manchester Piccadilly (Urban Centre/ Background)	NO ₂	Annual Mean	40	36	27	30	29	26.8
		1-hour Mean	200 ^(A)	0	0	0	0	0
	PM ₁₀	Annual Mean	40	20	15	15	17	15.1
		24-Hour Mean	50 ^(B)	7	1	2	4	1
	PM _{2.5}	Annual Mean	20	12	8	9	10	8.5

Notes:

(A) 200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times/year.

(B) 50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times/year

The data in Table 7 shows there have been no exceedances of the NO₂ annual mean AQAL at automatic monitor MAN3, which is located at an 'urban centre/background' location. 2023 UK-AIR background concentrations for the grid square containing MAN3 is 25.5 $\mu\text{g}/\text{m}^3$, which is comparable to the 2023 MAN3 monitored concentration.

Concentrations are less than 60 $\mu\text{g}/\text{m}^3$ and therefore in accordance with LAQM.TG22, exceedances of the short-term NO₂ AQAL are considered unlikely.

There are no exceedances of the annual mean PM₁₀ or PM_{2.5} AQAL at MAN3. This provides a good indication that the 2028 interim PM_{2.5} AMCT of 12 $\mu\text{g}/\text{m}^3$ should be met by the opening year.

2020 and 2021 data should be treated with caution due to the impacts of the COVID-19 pandemic and 'lockdowns' on local traffic flows.

4.1.2 Passive Monitoring

In addition to the passive NO₂ diffusion tube monitoring as part of the council's commitment to LAQM, NO₂ air quality monitoring was carried out at 432 locations for the purposes of the Greater Manchester Clean Air Plan (CAP). Monitoring locations closest to the Site are shown in Figure 4 and the data presented in Table 8.



Figure 4: Local Authority Monitoring

The data in Table 8 shows there have been exceedances of the NO₂ annual mean AQAL at CAP monitoring locations close to the Site between 2019 and 2022. The highest recorded concentration of NO₂ was monitored by CAP location 0014 which is situated on Great Ancoats Street, to the north of the Proposed Development.

Both LAQM monitoring locations showed an exceedance 2018 and 2019 but since then concentrations have decreased. Both LAQM sites shows a general decrease in concentrations between 2018 and 2022.

CAP monitoring locations however do not show any real trend in data. 2020 shows the lowest monitored concentrations due to the COVID-19 pandemic. However, 2022 results show elevated concentrations above the AQAL.

CAP locations 012, 013 and LAQM location MAN71NO are all located on Great Ancoats Street which is adjacent to the Proposed Development boundary and as such these concentrations are considered representative of Site conditions. As such, site suitability for residential use should be assessed to ensure that future site users are not exposed to elevated pollutant concentrations.

There has been one recorded exceedance of an annual mean greater than 60µg/m³. However, this was in 2019 and there has been a significant and sustained reduction in subsequent years. 2022 data does not exceed 60µg/m³ which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites.

2020 and 2021 concentrations should be treated with caution as they would have been impacted by the COVID-19 pandemic and the associated decrease in traffic levels during lockdown periods in the UK.

Table 8: Passive Diffusion Tube Monitoring Concentrations

Site ID	Site Type	X (m)	Y (m)	Distance from Site (m)	Annual Mean NO ₂ Concentration (µg/m ³)					
					2018	2019	2020	2021	2022	2023
LAQM Monitoring										
MAN71NO – Great Ancoats Street	R	385161	398290	25 NE	46.1	45.3	31.4	34.2	34.4	30.7
MAN9aNO – Newton Street	K	384601	398303	480 W	45.8	44.9	32.5	35.7	37.5	36.2
CAP Monitoring										
CAP_MANC_001	R	384744	398594	475 NW	-	-	44.2	46.6	50.9	49.3
CAP_MANC_0012	R	384980	398407	175 N	-	-	38.9	42.9	38.5	36.7
CAP_MANC_0013	R	384995	398363	130 N	-	54.1	34.5	40.8	51.2	48.2
CAP_MANC_0014	R	384837	398538	370 NW	-	61.6	35.1	40.0	43.0	39.5
CAP_MANC_0015	R	384757	398618	480 NW	-	-	36.4	43.0	51.4	44.1
CAP_MANC_092	R	384712	398093	410 SW		56.4	31.1	30.9	34.0	30.8

Notes:

R = Roadside K = Kerbside

Exceedances of the annual mean AQAL are shown in **BOLD**. All results taken from the 2023 ASR and Clean Air Manchester website, including level of accuracy and number of decimal places

5. Construction Phase Assessment

5.1 Overview

The construction phase of the Proposed Development will involve a number of activities that will release polluting emissions to air. Predominantly, these will be emissions of dust. As such, a qualitative construction dust risk assessment has been carried out in accordance with IAQM guidance¹⁸. Where detailed information was unknown, the dust emission magnitude has been estimated based on professional judgement.

Construction activities typically include:

- » material export and import;
- » temporary stockpiling of materials;
- » groundwork for foundations and services;
- » construction of buildings;
- » landscaping works; and
- » vehicle movements (with the potential to track-out material from site).

5.2 Potential Dust Emission Magnitude

5.2.1 Demolition

There are a number of existing structures on Site which are required to be demolished prior to construction. This volume to be demolished is estimated to be within the IAQM 'medium' category (12,000 m³ – 75,000 m³).

Based on the above, the potential dust emission magnitude for earthworks is considered to be '**Medium**'.

5.2.2 Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling the Site and landscaping.

The total area of the Site (including all areas inside the red-line boundary) is estimated to be c. 4,200m² and therefore within the IAQM 'small' category, <18,000m².

The underlying soil texture is loamy and clayey³⁸ which has a medium potential for dust release due to the soil texture partly being comprised of small particles.

Based on the above, the potential dust emission magnitude for earthworks is considered to be '**Small**'.

5.2.3 Construction

The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build.

The proposals comprise

- » Block A a 47 storey residential block; and
- » Block B a 24 storey mixed use block.

³⁸ Cranfield University, "Cranfield Soil and Agrifood Institute," n.d., <http://www.landis.org.uk/soilscapes/>.

Therefore, an estimation of the total volume of buildings to be constructed is considered to be >75,000m³.

It is not envisaged that concrete batching and sandblasting would be undertaken onsite.

Based on the above, the potential dust emission magnitude for construction is considered to be '**Large**'.

5.2.4 Trackout

The risk of impacts occurring during Trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size, speed and the duration of activities are also factors which are used to determine the risk of impacts.

It is expected that there could be between 20-50 HDV outwards movements from the Site each day. No unpaved surfaces over 50m would be utilised as site traffic would be routed along the existing road network.

Based on the above, the potential dust emission magnitude during Trackout is considered to be '**Medium**'.

5.2.5 Summary

Table 9 below shows a summary of the potential dust emission magnitudes from each activity, during each Phase.

Table 9: Dust Emission Magnitude Summary

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

5.3 Sensitivity of Area

The prevailing wind direction for the closest regionally representative meteorological measurement station to the Site, at Manchester Meteorological Station, is shown for 2023 in Appendix A. The wind rose shows that the prevailing winds are from the south.

Figure 5 shows the construction phase distance buffers (20m, 50m, 100m and 250m) around the Site boundary, as well as identified high and medium sensitivity receptor locations within these buffers.

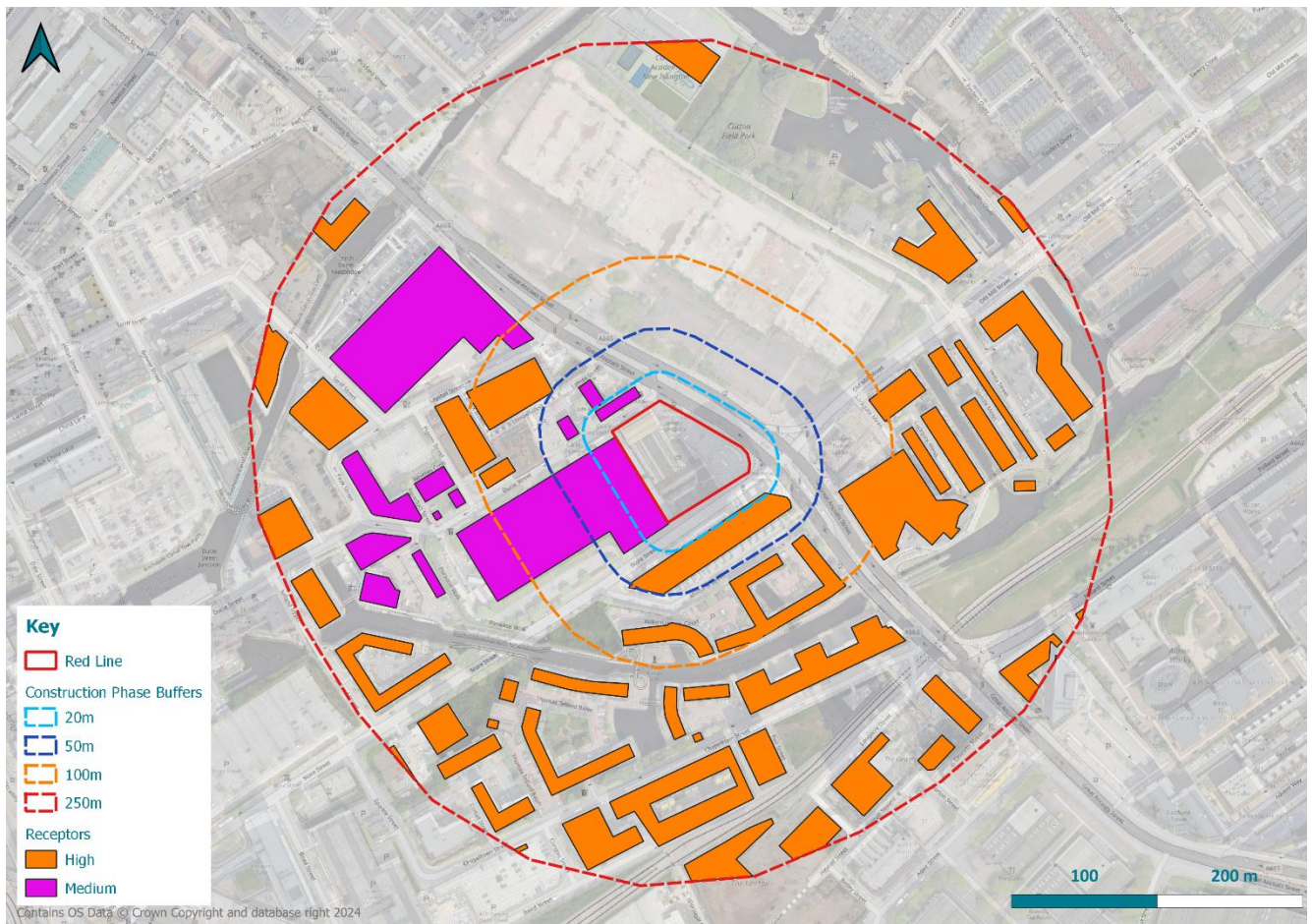


Figure 5: Construction Phase Receptors

5.3.1 Dust Soiling Impacts

Figure 5 illustrates there are considered to be between 10-100 high sensitivity human receptors within 20m of the Site boundary associated with the apartment building off Store Street to the south of the Site. As such, the overall sensitivity of the surrounding area to nuisance dust soiling effects during, Demolition, Earthworks and Construction, according to IAQM guidance, is defined as **'High'**.

With regard to Trackout, the sensitivity for sites is assessed where receptors are located within 50m from Trackout routes up to 250m from the Site. All potential Trackout routes have been taken into account. As a worst case there are between 10-100 high-sensitivity receptors within 20m of potential Trackout routes from the Site and as such, the sensitivity to dust soiling impacts from Trackout is defined as **'High'**.

5.3.2 Human Health Impacts

Defra mapped background predictions (Table 5) show that annual mean concentrations of PM_{10} are not likely to exceed $24\mu g/m^3$ in the vicinity of the Site based on 2023 estimates. Similarly, 2023 monitored concentrations at the MAN3 automatic monitor were $15.1\mu g/m^3$. As such, the annual mean PM_{10} concentrations likely to remain below $24\mu g/m^3$. According to IAQM guidance, where PM_{10} concentrations are $<24\mu g/m^3$ and there are between 10 -100 high sensitivity receptors within 20m of construction works, the overall sensitivity of the surrounding area to human health impacts is defined as **'Low'** for Demolition, Earthworks, Construction and Trackout.

5.3.3 Summary of Area Sensitivity

The sensitivity of the surrounding area for the potential impacts discussed above is summarised in Table 10 below.

Table 10: Sensitivity of Local Area

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

5.4 Risk of Impacts

Using the methodology prescribed in the IAQM guidance, the overall risk of impacts can be defined by combining the sensitivity of the area with the potential dust emission magnitude of each stage of the demolition and construction phase as described above.

Table 11 provides a summary of the construction dust risk assessment. Overall, the development is considered to be **High Risk** for nuisance dust soiling effects and a **Low Risk** for PM₁₀ health effects.

Table 11: Risk of Adverse Impacts During Construction Phase

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

6. Operational Phase Assessment

6.1 Trip Generation

The Proposed Development is 'car-free' and there are no car parking spaces proposed. All trips generated are for servicing, access or taxis. The Transport Consultants for the scheme, SLR Consulting, provided how trips associated will distribute onto the wider road network. This distribution is shown in Table 12 below.

As shown, Ducie Street and Peak Street will see a net increase of 118 AADT and 111 AADT respectively. All other surrounding road links will see an increase of below the EPUK & IAQM threshold. It should be noted that Ducie Street is one-way and therefore trips must route from the Site along this road. Once onto Peak Street and the wider road network, trips disperse to below the threshold.

Along Ducie Street and Peak Street the majority of surrounding land uses are offices (Ducie House) and commercial (Diecast and Aldi). The annual mean AQAL does not apply at these locations and while the short-term AQALs apply, baseline evidence suggests that the risk of exceedances is low. As such, detailed modelling of impacts has not been undertaken.

Table 12: Trip Distribution

Road Link	From	To	Existing Trips		Proposed Trips		Net Trips	
			Total AADT	HDVs	Total AADT	HDVs	Total AADT	HDVs
Great Ancoats Road	Port Street	Laystall Street	33	0	91	14	59	14
Great Ancoats Road	Laystall Street	Ducie Street	33	0	45	4	12	4
Great Ancoats Road	Ducie Street	Eastern Access	16	1	45	10	29	9
Great Ancoats Road	Eastern Access	Store Street	18	1	110	10	92	9
Old Mill Street	Vesta Street	Great Ancoats Road	11	0	30	3	19	2
Great Ancoats Road	Chapelton Street	Store Street	35	1	98	9	63	8
Store Street	Great Ancoats Road	Southern Access	28	1	108	10	80	9
Store Street	Southern Access	Jutland Street	4	0	7	1	3	1
Ducie Street	Northern Access	Peak Street	1	0	119	11	118	11
Ducie Street	Peak Street	Jutland Street	0	0	8	1	8	1
Peak Street - Laysall Street	Ducie Street	Great Ancoats Road	0	0	111	10	111	0

6.1 Exposure of Future Occupants

Due to the location of the Site, within the GMCA AQMA and in close proximity to major road links, detailed modelling has been undertaken in order to ensure that the Site is suitable for residential use, in air quality terms.

Maximum modelled annual mean NO₂, PM₁₀ and PM_{2.5} concentrations at each modelled floor height are shown in Table 13. As a reasonable worst-case, emission factors and background concentrations have been held at the 2023 base year. Modelled concentrations at each individual receptor are presented in Appendix D.

Table 13: Maximum Model Predicted Annual Mean Concentrations

Floor	NO ₂ (µg/m ³)	% of AQAL	PM ₁₀ (µg/m ³)	% of AQAL	PM _{2.5} (µg/m ³)	% of AQAL
Block A						
First	22.0	55	12.5	31	8.2	41
Second	21.5	54	12.4	31	8.1	41
Third	21.0	53	12.2	30	8.0	40
Fourth	20.7	52	12.1	30	8.0	40
Block B						
Fourth	20.6	51	12.1	30	8.0	40

As can be seen from Table 13, no exceedances of the AQALs are predicted for any pollutants across the Proposed Development. The maximum annual mean NO₂ concentration of 22.0µg/m³ is predicted on the first floor which is 56% of the relevant AQAL. It is noted that these concentrations are lower than the 2023 LAQM and CAP monitored concentrations for along Great Ancoats Street. However, receptors are set back from the road and at a greater elevation (minimum 1st floor height 8.8m) to the passive monitoring locations (between 2-3m). All results have been verified using MCC data.

The maximum annual mean PM₁₀ concentration is 12.4µg/m³ which is 31% of the relevant AQAL and the maximum annual mean PM_{2.5} concentration is 8.1µg/m³ which is 41% of the relevant AQAL. It should be noted that this PM_{2.5} concentration is also below the 2028 interim AMCT of 12 µg/m³.

With regard to the short-term 1-hour NO₂ AQAL, Defra's LAQM.TG(22) states where an annual mean is below 60µg/m³, it is unlikely exceedances of the 1-hour mean will occur. As all modelled results are below this threshold, it is unlikely that the 1-hour NO₂ AQAL will be exceeded at any of the receptor locations.

Additionally, the predicted annual mean PM₁₀ concentrations are well below 32µg/m³. Therefore, in accordance with relevant guidance 24-hour mean PM₁₀ concentrations greater than 50µg/m³ are unlikely to occur more than 35 times a year.

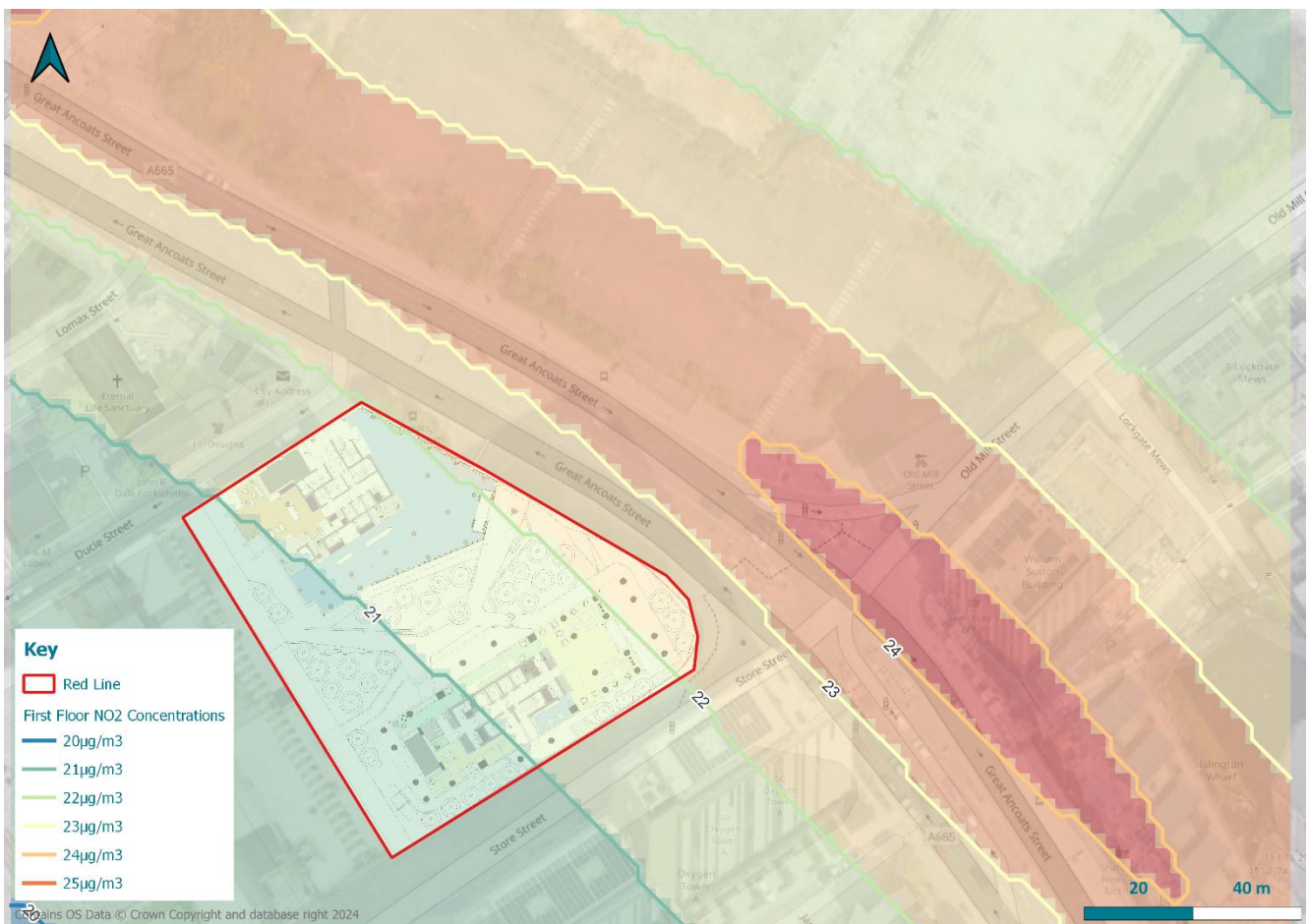


Figure 6: Modelled NO₂ Contour Plot – First Floor (8.8m)

The above figure demonstrates the highest concentrations of NO₂ are at the road centre line. These disperse to approximately 22µg/m³ before reaching the building façade of both Block A and Block B. It is noted that this grid is at 8.8m elevation to represent first floor residential properties.

6.1 Summary

The results of this assessment show that:

- » Based on the results of the assessment, the Proposed Development will not introduce any new receptors into an area of exceedance of any relevant AQAL.
- » Exceedances of the 1-hour mean NO₂ and 24-hour mean PM₁₀ AQALs are considered unlikely, based upon absolute concentrations predicted through the dispersion modelling study;
- » Modelling has been based on reasonable worst-case assumptions including holding background concentrations and emissions factors at a 2023 base year; and
- » all modelled concentrations have been verified against 2023 MCC monitoring data.

Based on the above, the Proposed Development is not expected to introduce new receptors into an area likely to be exposed to exceedances of the relevant AQALs.

7. Damage Costs

As previously stated, while operational phase impacts have been screened in line with the EPUK & IAQM guidance and MCC guidance, due to the size of the Proposed Development, in line with the MCC guidance it is considered good practice that a Damage Cost Calculation is undertaken, otherwise known as an Emissions Mitigation Assessment.

Increases in pollutant emissions (NO_x and PM_{2.5}) caused by the development over a 5-year appraisal period are estimated, using development traffic data, Defra's EFT (v.12.1) and Damage Cost Appraisal Toolkit.

The latest version of Defra's Air Quality Appraisal: Damage Costs Toolkit³⁹ (last updated March 2023) is then used to apply the 'damage costs', which are a set of impact values, defined per tonne of emission by pollutant, to these development emissions. The result is an indicative value to be spent on mitigation measures to reduce incremental worsening in local ambient air quality from new development.

The central base damage costs for 'Road Transport Urban Large' are provided below in £/tonne:

- » NO_x: £11,013
- » PM_{2.5}: £78,835

The damage cost calculation applies inflationary uplift factors of 2% cumulatively per annum to the central damage cost from Defra's damage cost valuations (2022) and assumes a discount rate of 1.5%.

The calculation used in this assessment is summarised in the below general formula:

$$EFT\ output \times Damage\ costs \times 5\ years = 5\ year\ health\ exposure\ cost\ value\ (in\ £)$$

It is noted that emissions were calculated by assuming a reduction in emissions, in line with the EFT, for each year in the appraisal. This was accounted for as an input into Defra's EFT.

Table 14, below, shows the inputs used for the damage cost calculation for Stocktons (Block A and Block B):

Table 14: Damage Cost Inputs

Input	Value	Unit	Source / Explanation
Trip Length	10	km	EPUK& IAQM guidance & National Travel Survey UK Average.
Traffic Flow	118 (9% HDV)	AADT	Worst-case scheme generated traffic, provided by SLR Consulting
EFT Road Type	Urban (Not London)	-	-
Appraisal Years	2028 - 2032 (5 years)	-	Reductions in line with EFT as forecast by Defra from the five years following proposed first occupation.
Average Speed	48	kph	Average speed of surrounding road links

³⁹ DEFRA, "Air Quality Damage Cost Appraisal Toolkit," March 2021, <https://www.gov.uk/government/publications/assess-the-impact-of-air-quality>.

Using the above inputs, the emissions caused by the development traffic are calculated for the years 2028 to 2032, which are the five years following the anticipated opening of the Proposed Development. The emissions per annum are shown below in Table 15.

Table 15: Increase in Emissions (tonnes)

Pollutant	Development Emissions (tonnes/year)				
	2028	2029	2030	2031	2032
NO _x	0.062	0.054	0.046	0.040	0.036
PM _{2.5}	0.009	0.009	0.009	0.009	0.009

These emissions are then converted to the cost of 'damage' to human health using the Air Quality Appraisal Damage Costs Toolkit. For this the price base year of 2024 was used. The pollutant sector used was 'Road Transport Urban Large'. The results of this are shown below in Table 16:

Table 16: Calculated Damage Cost Outputs

Pollutant	Low Sensitivity Present Value	Central Present Value	High Sensitivity Present Value
NO _x	£457	£2,689	£10,292
PM _{2.5}	£1,483	£3,741	£10,718
TOTAL	£1,941	£6,403	£21,011

Based on the outputs in Table 16, the total emissions 'damage costs' (sum of NO_x and PM_{2.5}) = **£6,403**, which is the indicative value of a package of air quality mitigation measures to offset the real-world impact of emissions from the Proposed Development.

8. Mitigation Measures

8.1 Construction Phase

The qualitative construction dust risk assessment shows that the works are **High Risk** for adverse impacts during both the demolition phase and construction phase, in the absence of mitigation.

To effectively reduce the risk of impacts to Negligible, appropriate mitigation measures should be adopted. The IAQM's highly recommended mitigation measures for High-Risk sites are provided at Appendix B of this report. Implementing these measures, such as within the Demolition Method Statement (DMP) and Construction Environment Management Plan (CEMP), should effectively reduce the risk of impacts to negligible during the construction phase.

8.2 Operational Phase

8.2.1 Design in Measures

The Damage Cost calculated provides an indicative value of a package of air quality mitigation measures to offset the real-world impact of emissions from the Proposed Development. These damage costs do not take account of the effects of the Travel Plan prepared by SLR Consulting. The Travel Plan measures will have air quality benefits where they promote and encourage the use of sustainable transport and lead to a reduction in the number of polluting trips that the development generates. However, the aim is to go above and beyond with regard to damage costs and offsetting air quality impacts. Possible 'design in' options could be, improved cycle paths, improved pedestrian crossings in the surrounding locale and green walls.

8.1.1 MCC AQ Planning Guidance – Best Practice

MCC Air Quality Planning Guidance¹⁹ provides best practice measures for Electric Vehicle charging points. However, it is understood that the development is 'car free' and therefore no parking is proposed.

MCC guidance also recommends good practice principles for design and operation. Measures include, but are not limited to:

- » EV charge point;
- » Travel Plan; and
- » Contributions to cycle and walking infrastructure.

8.1.2 Travel Plan Measures

Measures detailed within the associated Travel Plan, such as encouraging sustainable transport and promoting car sharing, will also help to reduce potential air quality impacts.

9. Discussion and Conclusion

Hydrock, now Stantec were commissioned by Liquid Business (Manchester) Ltd to prepare an AQA to support the planning for the residential led development known as Stocktons, Manchester.

Modelled UK-AIR background concentrations, Defra PCM roadside concentrations, and local air quality monitoring data have been used to establish baseline air quality at the Site and surrounding locale. Predicted background concentrations of NO₂, PM₁₀ and PM_{2.5} at the Site and surrounding locale are below the relevant AQALs. Local air quality monitoring however has shown exceedances of the annual mean AQAL for NO₂ in recent years, along major roads.

A qualitative construction dust risk assessment has been undertaken in line with IAQM guidance¹⁸ for the Construction Phase. Through good practice and implementation of appropriate mitigation measures outlined, it is expected that the release of dust would be effectively controlled and mitigated, with resulting effects considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature.

An operational phase assessment has been undertaken by following screening criteria provided in EPUK & IAQM guidance. Vehicle movements generated by the Proposed Development are below the relevant EPUK & IAQM guidance criteria once dispersed and as such, it is not anticipated that any significant adverse impacts on local air quality will occur and the Proposed Development is considered to be compliant with the NPPF and relevant local planning guidance.

A site suitability assessment has been undertaken due to the location of the Site within the GM AQMA. Emissions of NO₂, PM₁₀ and PM_{2.5} from traffic travelling along local roads were modelled in ADMS-Urban (version 5.1). The dispersion modelling undertaken was conservative as it applied reasonable worst-case assumptions by holding background concentrations and emission factors at the 2023 base year. The results demonstrated that there are not predicted to be any exceedances of the relevant AQALs at the Proposed Development on any residential floor in either Block A or Block B.

The total emission 'damage costs' of the Proposed Development (sum of NO_x and PM_{2.5} emissions) have been calculated as based on the site generated traffic. Using Defra's Air Quality Appraisal Damage Costs Toolkit, the emissions generated have been applied to the damage costs spreadsheet resulting in the sums of £6,430. This is the indicative value of a package of air quality mitigation measures to offset the real-world impact of operational phase emissions from the Site.

From the evidence presented, and by following the guidance provided herein, the Proposed Development will comply with all relevant air quality policy. As such, air quality should not pose any significant obstacles to the planning process.

Appendix A Traffic Data

The traffic data, comprising AADT flows sourced from the Department for Transport (DfT) Matrix⁴⁰ is shown below in Table 17. Data was sourced for the following scenarios:

- » 2023 AADT; and
- » 2028 DS (this scenario includes generated traffic associated with the Proposed Development).

Within the 2028 DS scenario, only major road links within 200m of the Proposed Development have been included because these would have the most influence on pollutant concentrations at the Site.

Table 17: Traffic Data

Link ID	Road Link	Speed (kph)	2023 Model Verification		2028 DS	
			AADT	HDV	AADT	HDV
L01	Great Ancoats Street (east of A662)	48	31,479	831	31,571	845
L02	Great Ancoats Street (past the Site) E	48	9,936	395	10,028	409
L03	Great Ancoats Street (past the Site) W	48	13,271	488	13,363	502

⁴⁰ Map Road traffic statistics - Road traffic statistics (dft.gov.uk).

Technical Memorandum



To: Lauren Massingham

From: Gareth Davis

Company: Hydrock

SLR Consulting Limited

Date: 15 October 2024

Project No. 410.066238.00001

RE: Manchester City Centre Traffic Growth

Application of Traffic Growth in Manchester

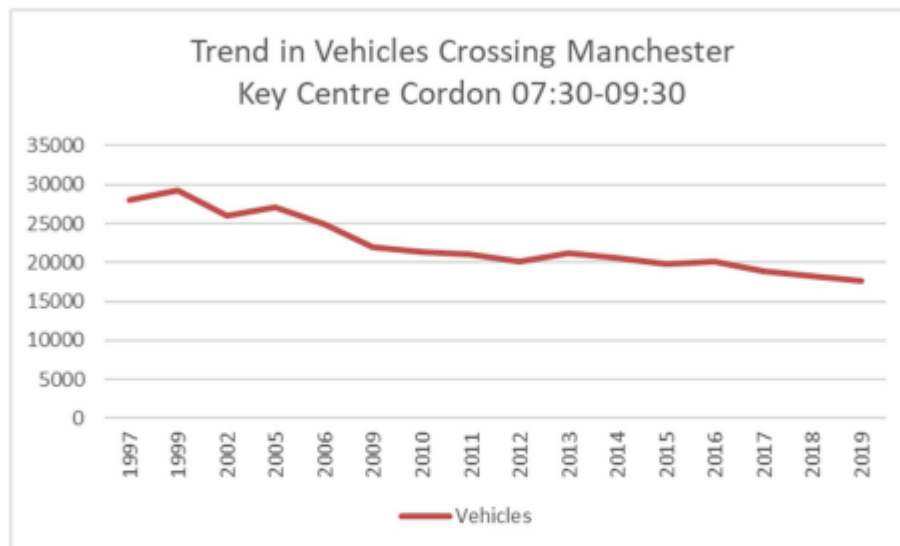
Typically to assess future traffic conditions, traffic growth is applied usually from the DfT TEMPRO programme which will apply a factor to take baseline traffic to a future year.

On development schemes in Manchester City Centre, within the Inner Relief Road (Ring Road) cordon it is notable from observation that traffic has not been growing despite the increases in population living in the city centre, possibly reflecting the loss of parking availability and highway changes limiting through routes within the city.

The Greater Manchester Transportation Unit, Highways Forecasting and Analytics team undertake annual surveys of traffic entering the city centre cordon (as defined by the Ring Road).

That data is presented in Figure 1 below and shows that over 20 years traffic has been falling by around 10,000 vehicles coming into the City Centre.

For this reason it is not appropriate to apply future year growth to traffic flows within the city centre and that it is reasonable to assume that existing flows will not increase in the future.



Source GMTU HFAS Manchester Key Centre Data



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Appendix B Windrose

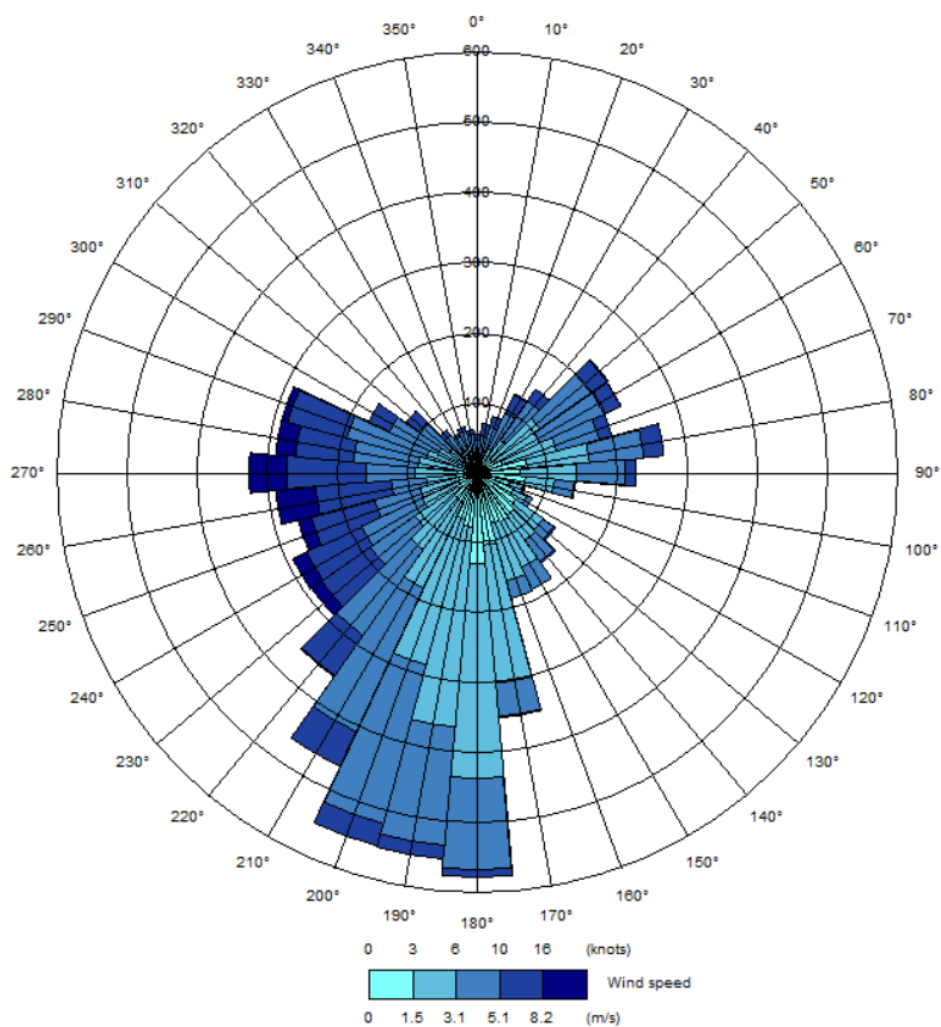


Figure 7: Wind rose Manchester Airport (2023)

Appendix C Model Verification

An important stage in the modelling process is model verification, which involves comparing the model output with measured concentrations in order to increase confidence in modelled predictions.

According to LAQM.TG (22), the difference between modelled results and monitored concentrations is acceptable where it is within 25% and ideal where it is within 10%.

Monitoring Locations used for Verification

The following monitoring locations were selected for model verification due to being representative of the study area and having more than 75% data collection for 2023:

- MAN17;
- CAP_012; and
- CAP_013.

Model Verification

It is most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides ($\text{NO}_x = \text{NO} + \text{NO}_2$). The model output of road- NO_x (i.e., the component of total NO_x coming from road traffic) has been compared with the 'measured' road- NO_x . Measured road- NO_x has been calculated from the measured NO_2 concentrations using the NO_x from NO_2 calculator (Version 8.1) available on the Defra LAQM Support website³³.

A comparison of modelled and monitored concentrations prior to adjustment are given in Table 18.

Table 18: 2023 Modelled and Monitored Concentrations Before Adjustment

Monitoring ID	Modelled Road NO_x ($\mu\text{g}/\text{m}^3$)	Monitored Road NO_x ($\mu\text{g}/\text{m}^3$)	Ratio Monitored/Modelled	Modelled Total NO_2 ($\mu\text{g}/\text{m}^3$)	Monitored Total NO_2 ($\mu\text{g}/\text{m}^3$)	Difference (%)
MAN71	12.3	21.9	1.8	26.0	31	-15
CAP_012	16.8	25.8	1.5	32.5	37	-12
CAP_013	10.5	52.0	5.0	29.4	48	-39

As shown, the model was under and over predicting concentrations of NO_x at all diffusion tubes. As such, an adjustment factor of **2.239** has been determined, as the equation of the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution of NO_x , as shown below:

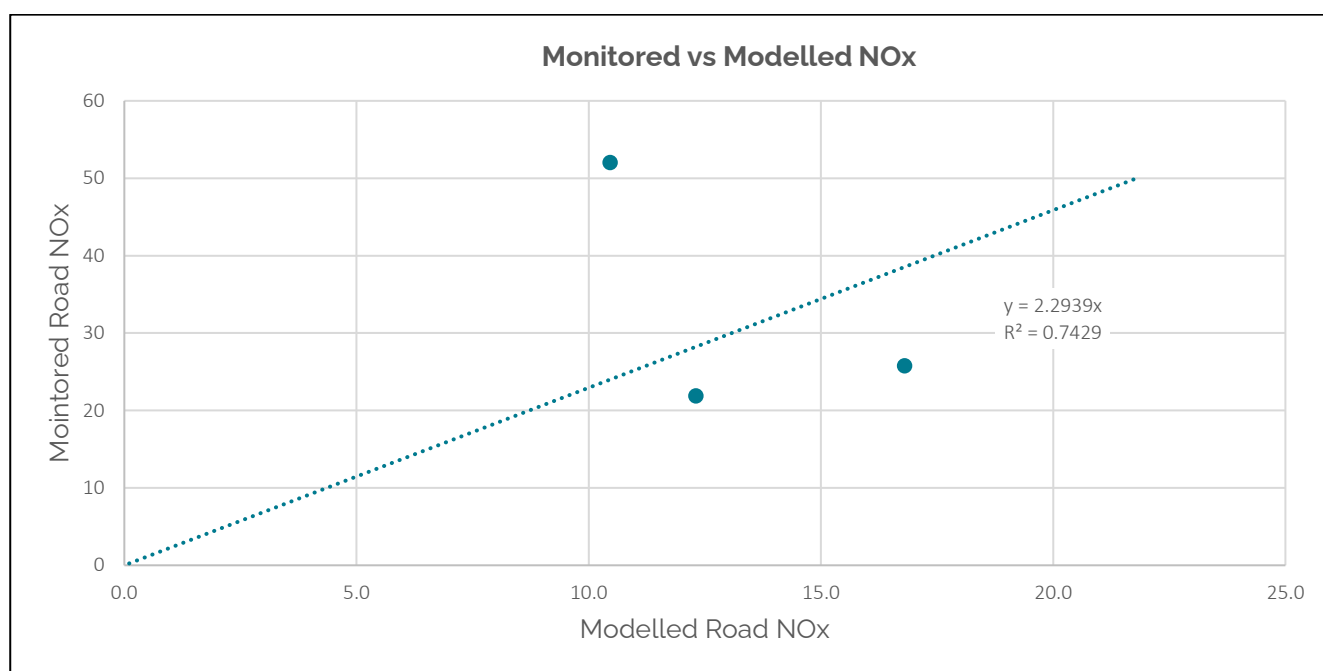


Figure 8: Model Adjustment Factor

Table 19 shows total monitored versus modelled NO_2 following the adjustment of the road contribution of NO_x by this factor. The total NO_2 concentration was determined by adding the calculated background NO_2 concentration to the modelled road contribution.

Table 19: Post-adjusted 2023 Modelled and monitored results

Monitoring ID	Adjusted Modelled NO_2 ($\mu\text{g}/\text{m}^3$)	Monitored NO_2 ($\mu\text{g}/\text{m}^3$)	Difference (%)
MAN71	33.7	30.7	9.8%
CAP_012	42.5	36.7	15.7%
CAP_013	35.9	48.2	-25.6%

Following adjustment of NO_x by a factor of **2.2939**, modelled concentrations of NO_2 were within the acceptable $\pm 25\%$ range of monitored concentrations:

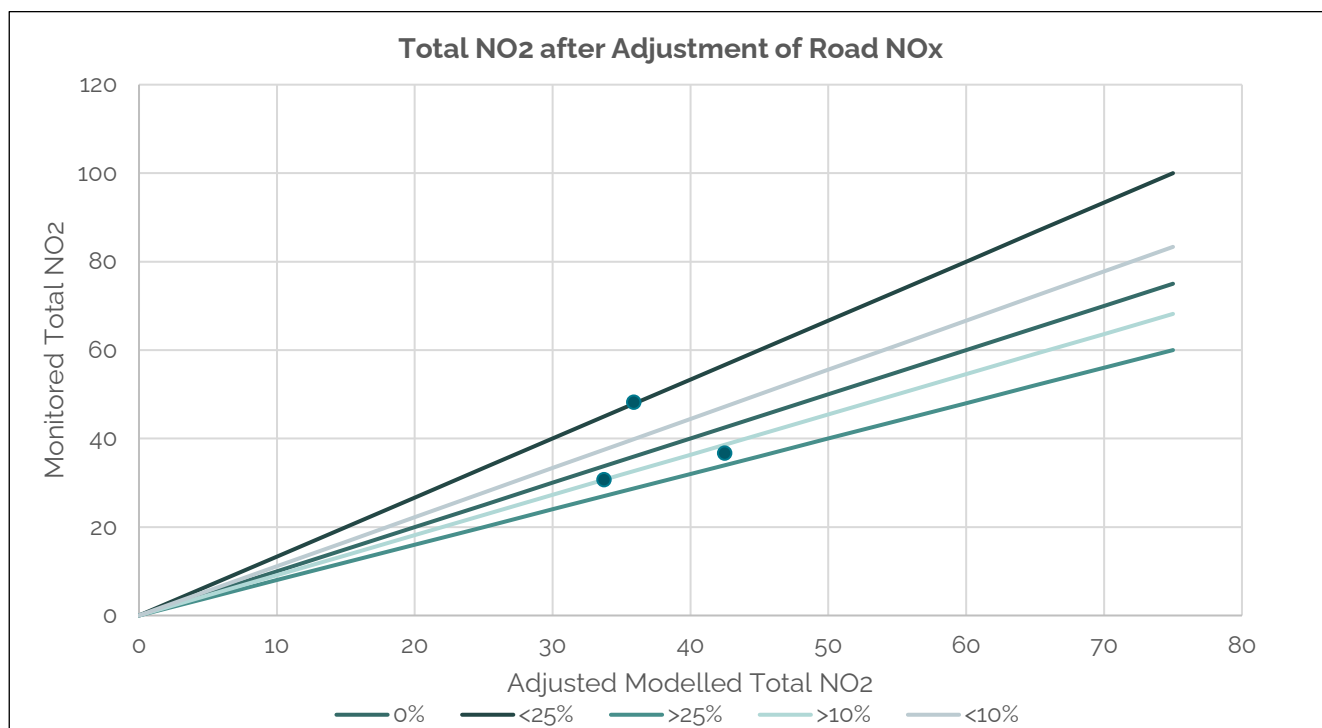


Figure 9: Post-adjusted Monitored vs Modelled NO₂

In addition, the overall post-adjusted uncertainty (RMSE) for annual mean NO₂ was 20.1%, which is within acceptable 25% range of uncertainty. As such, the factor was considered to be acceptable.

As there is insufficient PM₁₀ or PM_{2.5} monitoring data in the study area, it was not possible to perform model verification for these pollutants. As such, the NO₂ adjustment factor has also been applied to PM₁₀ and PM_{2.5} model results, in accordance with LAQM.TG(22).

Appendix D Modelling Results

Modelling has utilised 2023 emission factors and 2023 background concentrations as a reasonable worst-case. Additionally, the highest increase in trips on Great Ancoats Street (92 LDV AADT and 14 HDV AADT) have been added to all road links modelled.

Table 20: Model Predicted Annual Mean Concentrations

Receptors	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
Block B – Fourth Floor			
R01	20.6	12.1	8.0
R02	20.5	12.1	8.0
R03	20.5	12.1	8.0
R04	20.5	12.1	8.0
R05	20.5	12.1	8.0
R06	20.5	12.1	8.0
R07	20.4	12.1	8.0
Block A – First Floor			
R08a	22.0	12.5	8.2
R09a	21.7	12.4	8.1
R10a	21.4	12.3	8.1
R11a	21.8	12.4	8.1
R12a	21.5	12.3	8.1
R13a	21.3	12.3	8.1
Block A – Second Floor			
R14a	21.5	12.4	8.1
R15a	21.5	12.3	8.1
R16a	21.4	12.3	8.1
R17a	21.4	12.3	8.1
R08b	21.3	12.3	8.1
R09b	21.2	12.3	8.1
R10b	21.0	12.2	8.0
R11b	21.2	12.3	8.1
R12b	21.1	12.2	8.0

Receptors	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R13b	21.0	12.2	8.0
Block A – Third Floor			
R14b	21.0	12.2	8.0
R15b	21.0	12.2	8.0
R16b	20.9	12.2	8.0
R17b	20.9	12.2	8.0
R08c	20.9	12.2	8.0
R09c	20.8	12.2	8.0
R10c	20.8	12.2	8.0
R11c	20.9	12.2	8.0
R12c	20.8	12.2	8.0
R13c	20.7	12.2	8.0
Block A – Fourth Floor			
R14c	20.7	12.1	8.0
R15c	20.6	12.1	8.0
R16c	20.6	12.1	8.0
R17c	20.6	12.1	8.0
R08d	20.6	12.1	8.0
R09d	20.6	12.1	8.0
R10d	20.5	12.1	8.0
R11d	20.6	12.1	8.0
R12d	20.6	12.1	8.0
R13d	20.5	12.1	8.0

Appendix E Construction Dust Mitigation

In order to mitigate the worst-case dust impacts the following general mitigation measures are highly recommended by the IAQM for High Risk construction sites. Highly recommended mitigation measures applicable specifically to Demolition, Earthworks, Construction and Trackout are provided based on the respective risk of adverse impact.

Communications

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

Site Management

- » Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- » Make the complaints log available to the local authority when asked.
- » Record any exceptional incidents that cause dust and/or air emissions, either on- or 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 250 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 checks of surfaces such as street furniture, cars and window sills within 100 m of 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 PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and Maintaining the Site

- » Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- » Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- » Fully enclose site or specific operations where there is a high potential for dust production and the site is 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 on-site cover as described below.
- » Cover, seed or fence stockpiles to prevent wind whipping

Operating Vehicle / Machinery and Sustainable Travel

- » Ensure all vehicles switch off engines when stationary - no idling vehicles.
- » Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- » Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- » 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.
- » Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- » Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- » No bonfires and burning of waste materials.

Measures Specific to Demolition (High Risk)

- » Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- » Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.

- » Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- » Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks (High Risk)

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

Measures Specific to Construction (High Risk)

- » 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.

Measures Specific to Trackout (High Risk)

- » Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- » Avoid dry sweeping of large areas.
- » Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- » 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 bowzers 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.