



466 – 472 Moss Lane East

Air Quality Assessment

For CS Moss Lane East Limited

Date: 31 August 2022

Doc ref: 24138-HYD-XX-XX-RP-Y-2001_P03

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited Northern Assurance Buildings 9-21 Princess Street Manchester	Tel: 0161 804 5550 www.hydrock.com
Client	CS Moss Lane East Limited	
Project name	466 – 472 Moss Lane East	
Title	Air Quality Assessment	
Doc ref	24138-HYD-XX-XX-RP-Y-2001_P03	
Project no.	24138	
Status	Final	
Date	31/08/2022	

Document Production Record		
Issue Number	03	Name
Prepared by	LM	
Checked by	SM	
Approved by	SJS	

Document Revision Record			
Issue Number	Status	Date	Revision Details
P01	Draft	08/07/2022	Draft
P02	Draft	21/07/2022	Addressing Comments from Planner
P03	Final	31/08/2022	Final Report

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1. INTRODUCTION

Hydrock have been commissioned by CS Moss Lane East Limited to prepare an Air Quality Assessment (AQA) to support the planning application for a purpose-built student accommodation (PBSA) development (the 'Proposed Development'), on land at 466 – 472 Moss Lane East, Manchester (The 'Site'). The Site is located within a largely residential area, within the administrative boundary of Manchester City Council (MCC). Whitworth Park is located immediately to the north and there are commercial, educational and healthcare uses located within 500m of the Site to the north.

The Site is centred on the National Grid Reference (NGR); x384860, y395670 and shown below in Figure 1.



Figure 1 - Site Location

1.1 Proposed Development

The proposals seek full planning permission for a PBSA development and associated infrastructure at 466 – 472 Moss Lane East, Manchester. It is understood that the proposals comprise 261 bed spaces over 9 floors.

1.2 Purpose of Air Quality Assessment

The purpose of this AQA is to provide the following:

- Review of baseline air quality to assess the risk of exceedance of Air Quality Assessment Levels (AQALs) at the Site and surrounding area;

- Construction Phase Assessment to conclude on the requirements for mitigation to reduce the significance of impacts to negligible during this phase;
- Consideration of potential impacts during the operational phase, both in terms of vehicle and plant emissions; and,
- An assessment of the risk of future exposure of new human health receptors to poor air quality at the Site.

2. RELEVANT LEGISLATION

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 Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland² 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 Air Quality Strategy 2007 Volume 1² sets out the government's policies and framework for improving air quality in the UK with the aim of meeting the requirements of above legislation. The Air Quality Strategy 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). Those relevant to this assessment is provided below, in Table 1:

Table 1 - National Air Quality Objectives

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	

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/2010-to-2015-government-policy-environmental-quality/2010-to-2015-government-policy-environmental-quality#appendix-5-international-european-and-national-standards-for-air-quality>

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>

Pollutant	Averaging Period	AQALs	
PM _{2.5}	Annual Mean	20 µg/m ³	

Defra's Local Air Quality Management Technical Guidance 2016 (LAQM.TG(16))⁹ 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.
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-min 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 2021¹⁰ require local authorities to declare an Air Quality Management Area (AQMA) where an objective concentration has been predicted to be exceeded. In declaring an AQMA, the local authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the relevant AQALs.

Information regarding the Greater Manchester AQMA is detailed in Section 4.1.

⁹ Defra, "LAQM Technical Guidance LAQM.TG16" (Department for Food, Environment and Rural Affairs (Defra), April 2021), <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf>

¹⁰ Environment Act 2021 (legislation.gov.uk). Environment Agency, 9th November 2021.

2.3 National Planning Policy Framework

The National Planning Policy Framework (NPPF)¹¹ 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 174). 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 186), and the cumulative impacts from other sites (paragraph 185).

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 105).

2.4 Planning Practice Guidance

Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG)¹², 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 Strategy¹³ 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 Manchester future development. 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

¹¹ Ministry of Housing, Communities and Local Government, "National Planning Policy Framework," July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf.

¹² Ministry of Housing, Communities & Local Government, "Reference ID (32) Air Quality" (Ministry of Housing, Communities & Local Government, 2019), <https://www.gov.uk/guidance/air-quality--3>.

¹³ Manchester City Council, "Manchester's Local Development Framework, Core Strategy Development Plan Document, July 2012, Core Strategy | Manchester City Council

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”.

3. METHODOLOGY

3.1 Consultation

Full details of the AQA approach were sent via email to the Environmental Health Officer at MCC in June 2022 with a request for further comment / guidance. The response from the Moss Side ward officer that the proposed methodology was ‘acceptable’ was received on 30th August 2022:

The methodology is outlined below.

3.2 Guidance

The following guidance has been used to undertake this Air Quality Assessment:

- Defra’s LAQM.TG (16)⁹;
- EPUK & IAQM Land-use Planning & Development Control: Planning for Air Quality¹⁴;
- The IAQM’s guidance on assessing impacts from construction¹⁵;
- Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites¹⁶; and
- Manchester City Council, Air Quality and Planning Technical Guidance¹⁷.

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.

- Data from the National Atmospheric Emissions Inventory (NAEI)¹⁸, Environment Agency (EA) data¹⁹ and Defra’s PRTR²⁰;
- Defra’s modelled background concentrations of pollutants (UK-AIR)²¹. These estimates are produced using detailed modelling tools and are available as concentrations at central 1km² National Grid square locations across the UK;
- Defra’s modelled roadside concentrations of pollutants, including NO₂ (pollution climate mapping (PCM))²²;
- Natural England’s Multi-Agency Geographic Information for the Countryside (MAGIC)²³ data; and

¹⁴ 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>.

¹⁵ IAQM, “Guidance on the Assessment of Dust from Demolition and Construction” (Institute of Air Quality Management (IAQM)), February 2014), <http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf>.

¹⁶ IAQM, “A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites” (Institute for Air Quality Management (IAQM), June 2019), <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf>.

¹⁷ Manchester City Council, Air Quality and Planning Technical Guidance, February 2022.

¹⁸ NAEI <https://naei.beis.gov.uk/data/map-large-source>

¹⁹ Environmental Permitting Regulations – Waste Operations (data.gov.uk), accessed May 2022.

²⁰ Public registers (data.gov.uk), accessed May 2022.

²¹ UK-AIR, “Background Mapping Data for Local Authorities - 2018,” n.d., <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

²² UK Ambient Air Quality Interactive Map (defra.gov.uk)

²³ Natural England and MAGIC partnership organisations., “Multi Agency Geographic Information for the Countryside.”, 2020, <https://magic.defra.gov.uk/MagicMap.aspx>, accessed May 2021.

- Greater Manchester Combined Authority (GMCAs) latest available air quality monitoring data, derived from the latest available air quality annual status report published in 2021²⁴. At the time of assessment, these data were from 2020.

3.4 Construction Dust Risk Assessment

The construction dust risk assessment is provided in Section 5 and has been undertaken in line with IAQM guidance. 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, a risk assessment should be undertaken where high-sensitivity receptors are located within 50m of a Site boundary. The Multi Agency Geographic Information for the Countryside (MAGIC) website, which incorporates Natural England's interactive maps²³ has been reviewed to identify whether any statutory ecological sensitive receptors are situated within 50m of the site boundary or within 50m of any routes used by construction vehicles on the public highway, up to 500m from the site entrance. There are no ecological designations within the specified buffers and therefore impacts on ecological designations have not been considered further within this assessment.

With regard to nuisance dust soiling and human health impacts, within distances of 20m of the Site boundary there is a high risk of dust impacts. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the prevailing wind direction in relation to the dust source. It is considered that for receptors more than 350m from the site boundary, the risk is negligible. Sensitive receptors were identified within 350m of the site boundary. Based on the IAQM guidance residential dwellings, museums, car parks and car show rooms are indicative examples of high sensitivity receptors in relation to dust soiling and / or 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.

3.5 Impact Assessment

3.5.1 Scope of Impact Assessment

The scope of assessment has been determined against the EPUK & IAQM's two stage checklist criteria¹⁴. The Stage 1 Criteria identifies whether a development requires an AQA. As the proposals include more than 10 residential dwellings and more than 10 parking spaces, consideration of Stage 2 is required.

The relevant checklist criteria shown in Table 3 identify whether a detailed assessment of potential air quality impacts is required. Only relevant screening criteria have been included.

²⁴ GMCA, 2020 Air Quality Annual Status Report (ASR) June 2021.

Table 3 – EPUK & IAQM detailed 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 NO _x 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.

With regard to screening criteria 1 and 2, the Transport Consultants on the scheme are RSK who have confirmed the Proposed Development is not expected to cause an increase in traffic flows above the defined threshold levels. Details regarding trip generation are shown in Section 6.2. For detailed assessment; however, the Site is located within the GM AQMA and therefore a site suitability assessment is required.

With regard to screening criteria 3, the energy strategy is still under development but no substantial combustions sources, such as combined heat and power (CHP), are proposed for the energy / heating strategy on-site. The proposed energy strategy is for an all-electric solution with heating via Air Source Heat Pumps (ASHPs) which will be mounted at roof level. These are beneficial in terms of air quality as they do not introduce any new combustion sources or processes.

Based on the above, a detailed assessment for site suitability is required, in accordance with EPUK & IAQM guidance and MCC Air Quality and Planning Technical Guidance, according to the methodology outlined below.

3.5.2 ADMS-Urban Dispersion Model

A detailed AQA has been undertaken using the air dispersion model ADMS-Urban v5.1 to establish the current and future air quality situation 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 2019; and
- 2025 Do Something (2025 DS) – 2025 opening year flows in addition to Proposed Development traffic.

3.5.4 Model Inputs

3.5.4.1 Traffic Data

Traffic data used in the model was sourced from the Department for Transport (DfT) Matrix²⁵, which contains traffic flows for all motorways and major A-roads throughout the UK. The following count points have been used within this AQA:

- Moss Lane East, DfT count point 944407;
- Wilmslow Road / Oxford Road, DfT count point 57603; and
- Hyde Road (A57), DfT count point 56582 (for 2019 model verification).

The section of Oxford Road modelled is only accessible for buses and taxis. DfT traffic data splits the traffic flow into categories. Therefore, the 'buses and coaches' category was selected for this road link. Taxis are included within the 'car and taxis' category and therefore it was not possible to include taxis within the traffic flow.

TEMPro growth factors, supplied by the transport consultants RSK, were applied to the data, which accounts for future local growth. The modelled road links are shown in Figure 2 below, with full details provided in Appendix A.

²⁵ Map Road traffic statistics - Road traffic statistics (dft.gov.uk).

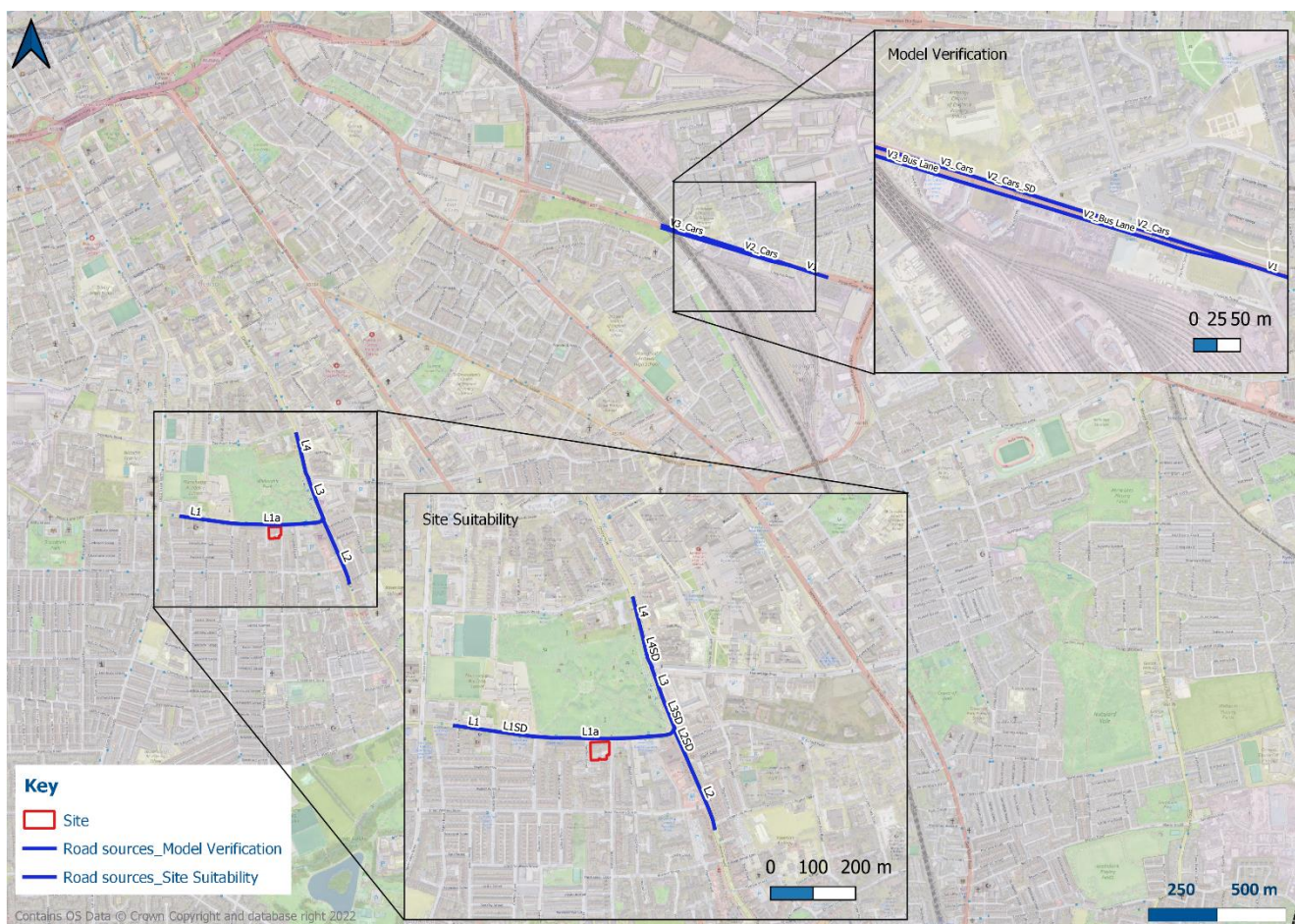


Figure 2 – Road Links Included in Dispersion Model

3.5.4.2 Emission Factors

Emission rates for NO_x , PM_{10} and $\text{PM}_{2.5}$ used for the dispersion modelling assessment were calculated from the latest Emissions Factor Toolkit (EFT) (v.11) which was released in November 2021.

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. However, there is some uncertainty over the accuracy of the future predictions.

3.5.4.3 Speed Data

For each road link, vehicle speeds were obtained from the speed limit for each road derived from the OpenStreet Browser v4.10²⁶, which has been used as a proxy for average speeds on the network. Vehicle speeds were reduced within 50m of junctions relative to the speed limit to account for queuing and congestion in the average speed profile, in accordance with LAQM.TG (16). Google typical traffic was used to assist with determining appropriate slow down speeds across the study area.

²⁶ https://www.openstreetbrowser.org/#map=15/53.7033/-1.2698&categories=car_maxspeed,

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: 2019'²⁷, 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 3 shows the diurnal traffic profile included in the model.

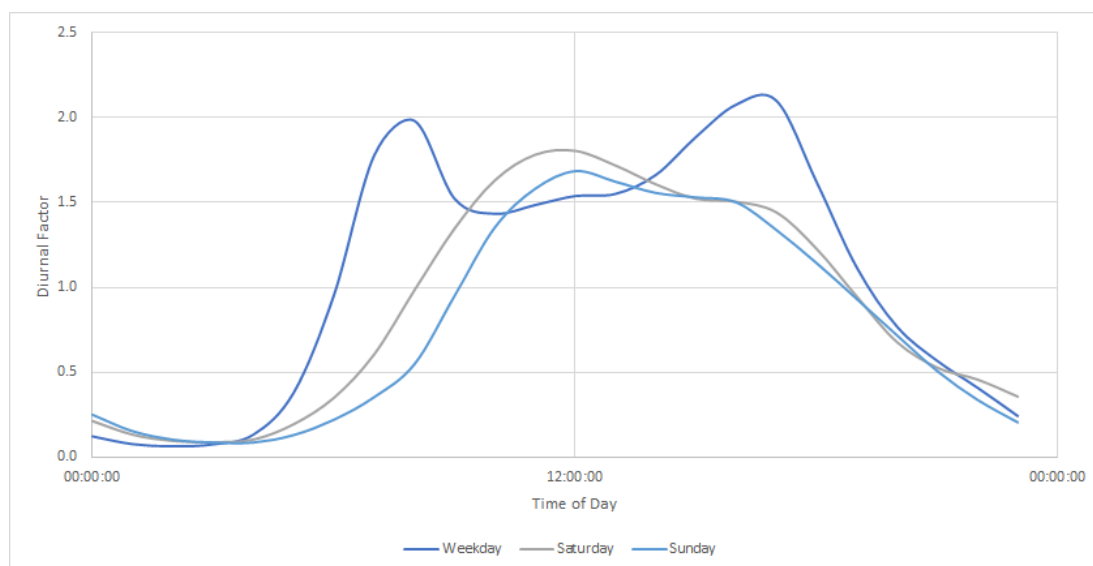


Figure 3 – Diurnal traffic profile included in the dispersion model

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 2019 data from Manchester Airport, with missing data taken from Rostherne Meteorological Station. Manchester Airport is located approximately 11.5km south-west of the Site. It is the closest and most relevant meteorological station that records all of the parameters necessary for dispersion modelling. A wind rose is presented in Appendix B.

Data Capture is as follows:

- wind speed: 100 %;
- wind direction: 99.8 %;
- temperature: 99.9 %; and
- cloud cover: 87.4 %.

²⁷ 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>.

3.5.4.6 Surface Characteristics

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

- Dispersion site surface roughness = 1m (ADMS pre-set 'cities and woodland');
- Met site surface roughness = 0.02m (ADMS pre-set 'open grassland');

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

- Dispersion site = 30m;
- Met site = 20m.

3.5.5 Receptors Included in Dispersion Model

Discrete model receptors were positioned at breathing height (1.5m and 4.5m) to represent ground floor and first floor level, respectively, at the façades of the Proposed Development. These are shown in Figure 4 below:



Figure 4 - Modelled Future Receptors

In addition, to illustrate the dispersion of NO₂ across the Site, a receptor grid was modelled at 1.5m breathing height, originating at grid reference x384790, y395590. The grid was made up of approximately 100m x 100m receptor points at 1.4m spacing from the originating grid reference.

3.5.6 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 tool²⁸, in the first instance to match the roadside NO_x from the diffusion tubes with modelling outputs and secondly to convert corrected model outputs to NO₂ estimations.

3.5.7 Model Verification

A verification study has been undertaken using MCC's air quality monitoring data from 2019 for diffusion tube site MA88ANO. Full details of this are included in Appendix C. The model was found to be under-predicting concentrations of NO_x and NO₂; therefore, an adjustment factor of **2.992** was applied to the model results.

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(16). This approach is considered likely to provide a conservative estimate of the contribution of modelled roads to ambient PM₁₀ and PM_{2.5} concentrations.

3.6 Model Limitations

There are inherent uncertainties associated with the model (ADMS Urban) used in this assessment, including the 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 the ADMS model will not take into account.

To account for uncertainty in future emission factors and pollutant concentrations, a sensitivity study has been undertaken where by:

- Emission Factors held at 2019 (no future improvements in vehicle emissions assumed);
- Background pollutant concentrations held at 2019 (no future improvements assumed); and
- Traffic flow forecasts are based on 2025 development opening year as obtained from the Transport Consultants.

The above assumptions ensure a conservative approach has been considered in the assessment. The results of the sensitivity assessment are presented in Appendix D.

²⁸ Defra, "NO_x to NO₂ Calculator" (Defra, 2019), <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc>.

4. BASELINE AIR QUALITY CONDITIONS

Baseline air quality conditions in the study area are established through compilation and review of appropriately sourced monitoring and modelling data.

4.1 Greater Manchester AQMA and CAZ

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.” Moss Lane East (situated adjacent to the northern Site boundary) and Wilmslow Road (situated approximately 150m east of the Site) are located within the Greater Manchester AQMA. Reference should be made to Figure 5 for the location of the AQMA relative to the Site.

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



Figure 5 – Greater Manchester AQMA

The Proposed Development will also be located within the proposed Greater Manchester CAZ which although currently 'in review' is due to be implemented in Summer 2022. In relation to the GM Air Quality Plan, there are at-risk road links in the vicinity of the Site along Wilmslow Road²⁹. Therefore, the development should ensure that

²⁹ GM Clean Air Plan Map | MappingGM, accessed June 2022.

compliance is not worsened as a result of emissions from development traffic flows. The ‘at-risk’ road link is shown in Figure 6.

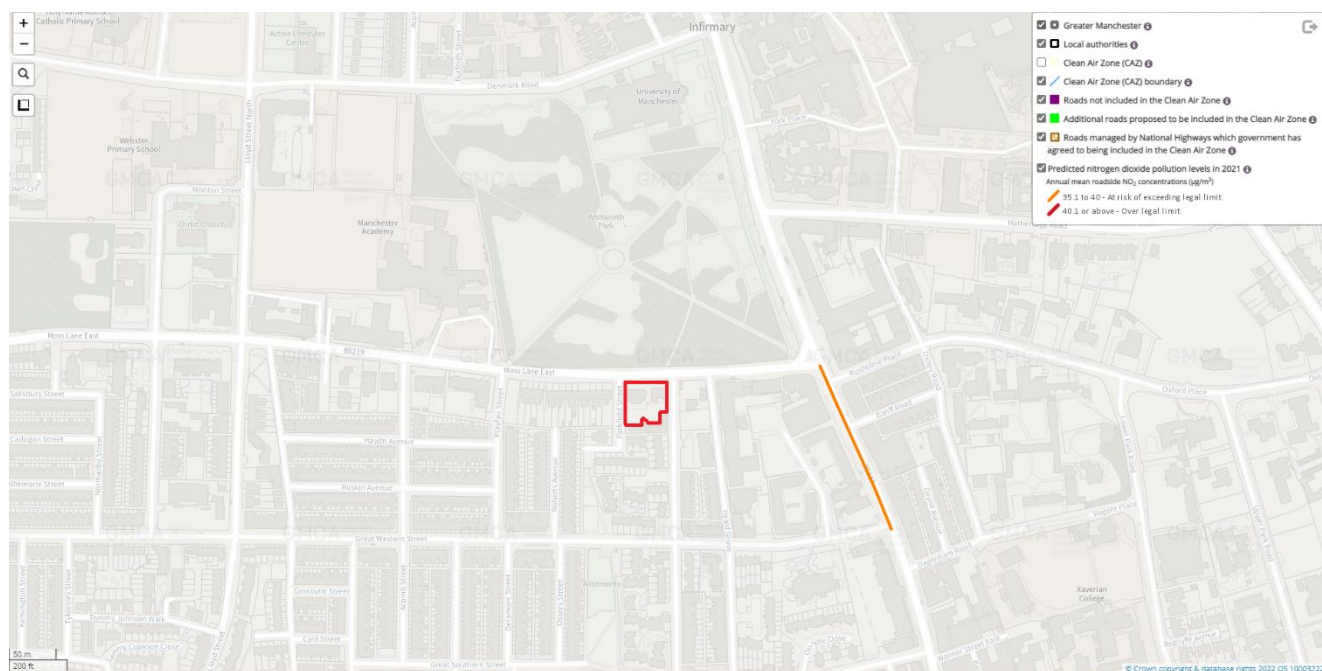


Figure 6 – Greater Manchester CAZ – At Risk Link Roads (Application Site Boundary in Red)

4.2 Local Emissions Sources

Emissions from road vehicles travelling along Moss Lane East, which abuts the Site to the North and Oxford Road / Wilmslow Road located 150m to the east, are considered to be the main pollutant sources affecting local ambient air quality at the Site.

A review of the NAEI¹⁸, EA¹⁹ and Defra’s PRTR²⁰ data indicates the following point sources within 1km of the Proposed Development, as shown in Table 4 and Figure 7.

Table 4 – NAEI Large Point Sources within 1km of the Proposed Development

Plant ID and Operator	Environment Agency Permit Number	Sector	NGR (m)		Distance / Direction from Proposed Development
			X	Y	
8891 Manchester University NHS Foundation Trust	XB3694DK	Public administration	384979	396212	540m - N
8185 Heineken UK Limited	BV7796IW	Food, drink & tobacco industry	384030	396020	877 - NW

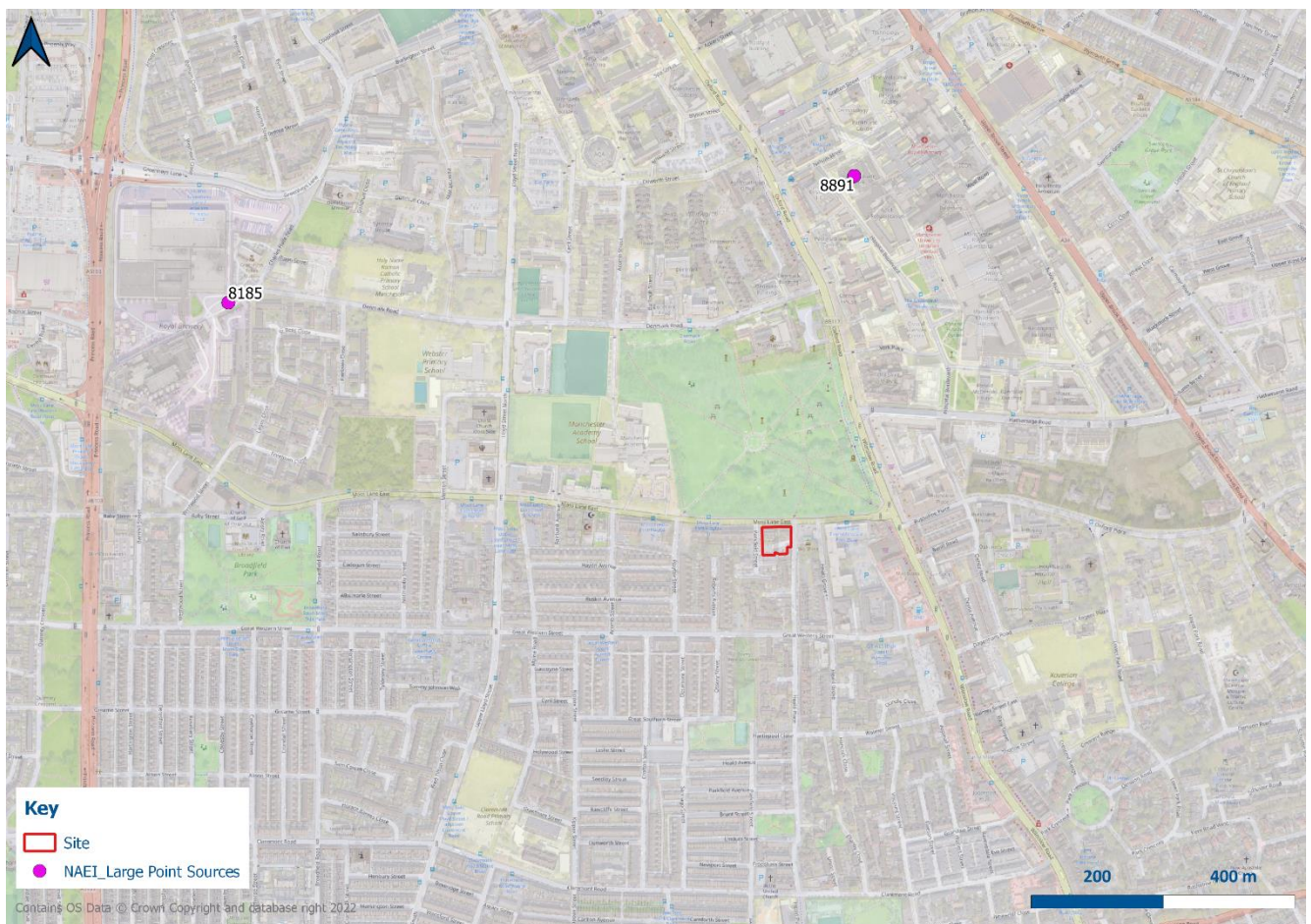


Figure 7 – Local Emission Point Sources

The above facilities have the necessary Environmental Permits for potentially polluting activities (emissions to Air) which include provisions to reduce emissions to air. It has been reasonably assumed that emissions from the facilities contribute to background concentrations, as detailed below. Therefore, the contribution from these sources is taken into account within the background concentrations used in the assessment.

4.3 Defra Mapped Background Concentrations

Mapped background concentrations of NO_2 , PM_{10} and $\text{PM}_{2.5}$ were downloaded for the grid squares containing the Site. Mapped background concentrations have been obtained based upon a 2018 base year Defra (August 2020 publication)²¹.

Background pollutant concentrations for 2019 (the verification year), 2022 (the current year) and for 2025 (the completed opening year of the Proposed Development) are displayed in Table 5.

Table 5 – Defra Mapped Background Concentrations

Grid Square (x,y)	Pollutant	AQAL ($\mu\text{g}/\text{m}^3$)	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)		
			2019	2022	2025
384500, 39500	NO ₂	40	18.3	16.2	14.7
	PM ₁₀	40	12.9	12.4	12.1
	PM _{2.5}	25	8.7	8.4	8.1

The data show annual mean background concentrations of NO₂, PM₁₀ and PM_{2.5} at the grid square within which the Site is located are below the AQALs in all years.

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.

4.4 Defra Roadside Modelled Concentrations

Defra have modelled roadside concentrations of a variety of pollutants, including NO₂ using the PCM. The closest roads (A34) for which data is available, is shown below in Figure 8. Whilst data is not available for Moss Lane East and Wilmslow Road, the A34 is anticipated to be the predominant source of air pollutants in the locale.

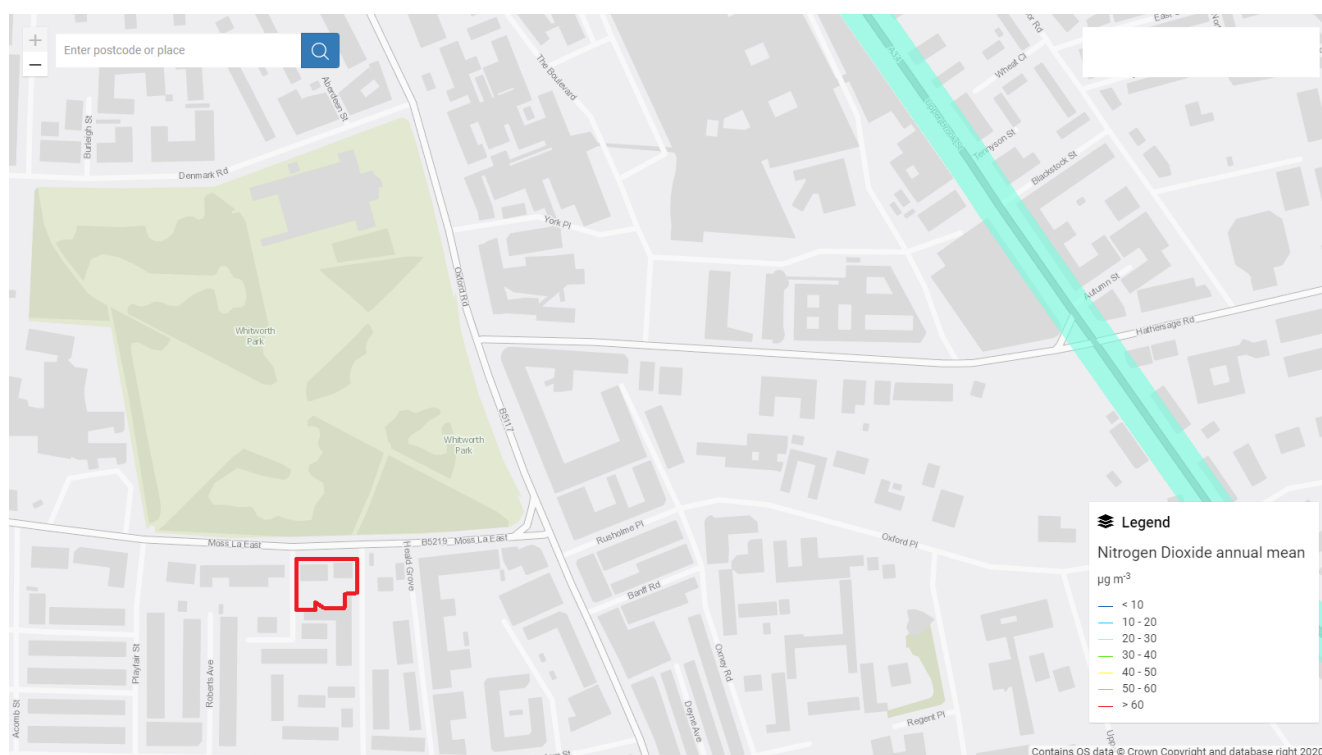


Figure 8 - Defra Modelled PCM Roadside NO₂ Concentrations (Site Boundary in Red)

Figure 8 illustrates 2019 modelled roadside NO₂ concentrations on the A34 are 25 $\mu\text{g}/\text{m}^3$. These concentrations are 37% below the NO₂ AQAL. It is recognised there are uncertainties associated with these modelled concentrations; therefore, further analysis of local air quality monitoring is provided below.

4.5 Air Quality Monitoring Data

4.5.1 Automatic Air Quality Monitoring

The UK Automatic Urban and Rural Network (AURN) 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 website³⁰.

The closest AURN monitor to the Site is the Manchester Piccadilly AURN (NGR: x384311, y398337) located approximately 2.6km north from the Site. The Manchester Piccadilly AURN is classified as an ‘urban background’ monitor, defined by LAQM.TG(16) as: “urban location distanced from sources and therefore broadly representative of citywide background conditions, e.g. urban residential areas”. The monitor is run jointly with MCC, who classify the monitor (MAN3) as ‘urban centre’, defined by LAQM.TG(16) as: “An urban location representative of typical population exposure in towns or city centres, for example, pedestrian precincts and shopping area”.

MCC also undertakes additional continuous air quality monitoring at within the Council’s area. The closest of these continuous air quality monitors to the Site is Manchester Oxford Road (MAN1) (NGR: x384233, y397287) located approximately 1.7km north of the Site. The Manchester Oxford Road automatic monitor is classified as ‘kerbside’, defined by LAQM.TG(16) as: “A site sampling within one metre of the kerb of a busy road”.

Recent monitoring data from the automatic monitors is shown below in Table 6 and its location highlighted in Figure 9.

Table 6 – Automatic Monitoring Results

Monitor	Pollutant	AQAL	AQAL (µg/m ³)	Concentration (µg/m ³)		
				2018	2019	2020
MAN 1 Manchester Oxford Road	NO ₂	Annual Mean	40	62	59	36
		1-hour Mean	200 ^(A)	2 ^(C)	1 ^(C)	0 ^(C)
	PM ₁₀	Annual Mean	40	30	26	18
		24-Hour Mean	50 ^(B)	15 ^(D)	18 ^(D)	5 ^(D)
MAN 3 Manchester Piccadilly	NO ₂	Annual Mean	40	35	36	27
		1-hour Mean	200 ^(A)	0 ^(C)	0 ^(C)	0 ^(C)
	PM ₁₀	Annual Mean	40	21	20	15
		24-Hour Mean	50 ^(B)	2 ^(D)	7 ^(D)	1 ^(D)
	PM _{2.5}	Annual Mean	20	11	12	8
Notes: ^(A) 200µg/m ³ not to be exceeded more than 18 times/year ^(B) 50µg/m ³ not to be exceeded more than 35 times/year ^(C) Number of 1-hour means >200µg/m ³ ^(D) Number of 24-hour means >50µg/m ³						

³⁰ Automatic Urban and Rural Network (AURN) - Defra, UK.

As shown in Table 6 above, the annual mean NO₂ AQAL was breached in 2018 and 2019 at the MAN1 monitor. Whilst concentrations reduced significantly in 2020, results should be treated with caution due to the effects of the COVID 19 pandemic on traffic flows. Due to the monitors proximity to Oxford Road, higher concentrations are anticipated. Annual mean NO₂ concentrations at the MAN3 monitor have not exceeded the AQALs during recent years.

The short-term concentrations of NO₂ remained below the relevant AQAL at both monitors.

With regard to measured concentrations of PM₁₀ and PM_{2.5}, concentrations were below the relevant AQALs during the period 2018 to 2020 at both monitors.

4.5.2 Passive Diffusion Tube Monitoring

Passive diffusion tube monitoring is currently undertaken by MCC at numerous locations throughout the Council's area as part of their commitment to LAQM. The diffusion tubes are located in areas which are deemed to require further assessment of NO₂ concentrations. The latest Annual Status Report²⁴ states that in 2019, the monitoring network consisted of 45 NO₂ diffusion tubes. Monitoring locations within 2km of the Site are detailed below. The location of these monitoring sites in relation to the Site are shown in Figure 9:

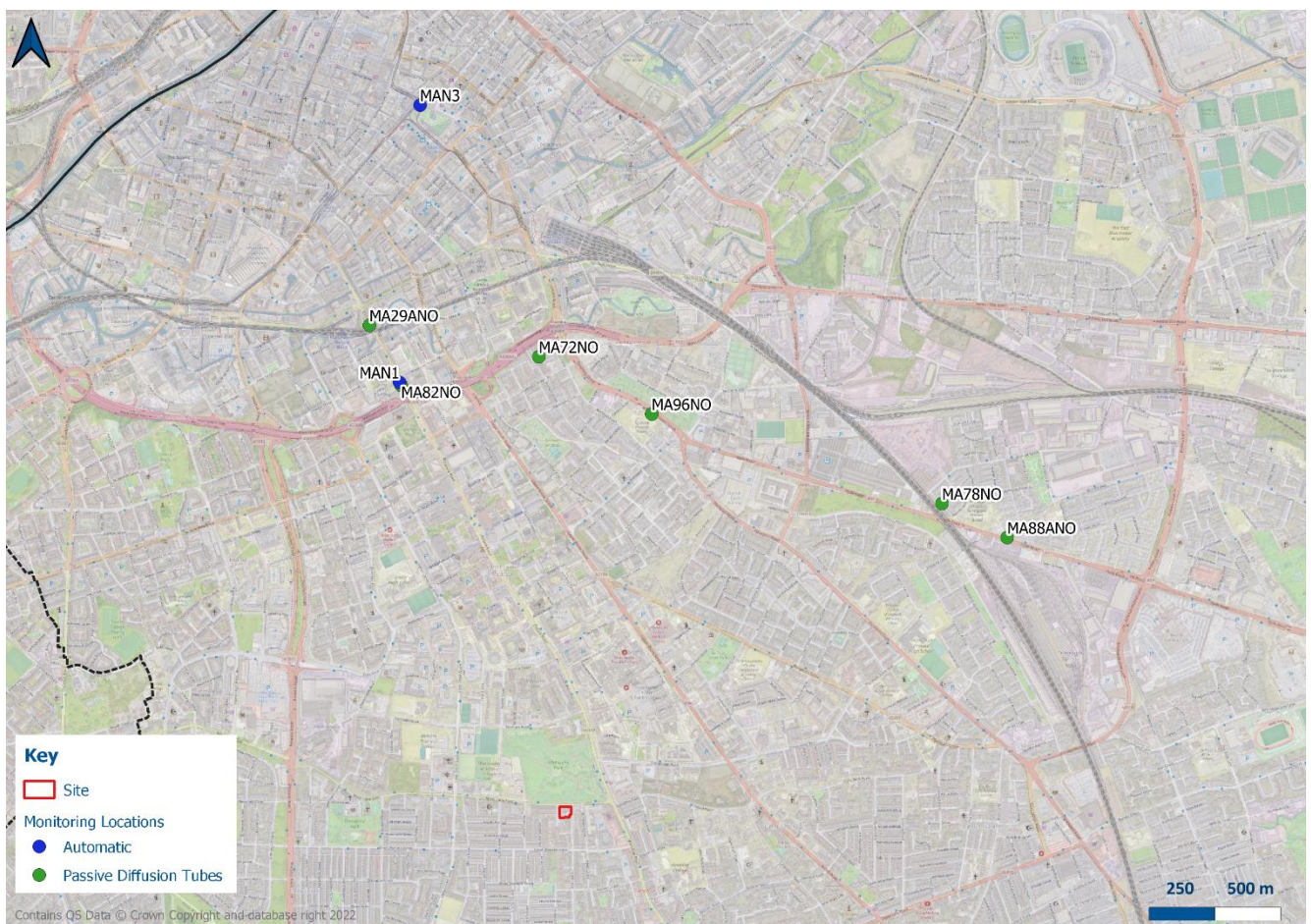


Figure 9 –Monitoring Sites

The data for the monitoring sites shown in Figure 9 are reported in in Table 7 below:

Table 7 – Passive Diffusion Tube Monitoring Results

Site ID	Site Name	Site Type	X	Y	In AQMA	Annual Mean NO ₂ Concentrations (µg/m ³)				
						2016	2017	2018	2019	2020
MA29ANO	Oxford Street	Roadside	384119	397503	YES	66.2	57.7	58.8	55.4	39.0
MA72NO	Lockton Close	Urban Background	384761	397384	YES	40.0	34.6	33.4	32.8	24.5
MA78NO	Rostron Avenue	Urban Background	386289	396828	YES	37.0	38.3	33.2	33	23.2
MA84NO	Manchester Oxford Road	Roadside	384239	397276	YES	60.2	56.2	54	52	34.1
MA88ANO	Hyde Rd/Clowes St	Roadside	386536	396699	YES	52.7	47.5	44.3	43.3	32.5
MA96NO	Ardwick Green	Roadside	385189	397167	YES	-	-	-	46	36.4

Notes: **Bold** values denote exceedance of the Annual Mean AQAL.
 *Data and Site ID from 2021 GMCA ASR

MA78NO is considered to be the most representative monitoring location for the Proposed Development, based on its distance from major roads. It is located 50m from A57 and has not monitored any exceedances of the AQAL during recent years.

2020 concentrations should be treated with caution due to the COVID 19 pandemic and its impact on traffic and the local highways networks across the UK.

2019 Concentrations at all monitoring locations are less than 60µg/m³ and therefore in accordance with LAQM.TG16, exceedances of the short-term objective are considered unlikely. The only exceedances of 60µg/m³ occurred during 2016 at location MA29ANO and MA84NO.

The 2020 GMCA ASR²⁴ states the following with regards to data trends in Manchester:

“Notwithstanding COVID-19 lockdown impacts on local air quality, which are discussed further below, long term monitoring trends indicate that there has been an improvement in air quality across the city but it is likely that, during business as usual circumstances, parts of Manchester will still remain above the annual limit for NO₂.”

5. CONSTRUCTION DUST RISK 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 Guidance.

Construction activities will 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 Construction Traffic Emissions

The IAQM's 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 IAQM traffic criteria outlined in Table 3.

5.3 Dust Emission Magnitude

5.3.1 Demolition

There are existing buildings on site that are required to be demolished prior to earthworks and construction phases.

The total building volume proposed to be demolished <20,000m³. The material to be demolished consists of tiles, brick, concrete, timber, steel, blockwork and glass.

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

5.3.2 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 (1,776m²) is within the IAQM's 'Small' criteria (<2,500m²). The underlying soil texture is "slowly permeable seasonally wet acid loamy and clayey soils"³¹ which have a reasonably high potential for dust release when due to the small particle size. There will be <5 heavy earth moving vehicles on Site at any one time.

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

5.3.3 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.

³¹ Cranfield University, "Cranfield Soil and Agrifood Institute," n.d., <http://www.landis.org.uk/soilscapes/>.

An estimation of the total volume of the building to be constructed has been estimated based on the Masterplan layout of the Proposed Development.

The total volume will be within the IAQM's Medium category (25,000m³ – 100,000m³). The construction materials used will be tiles, brick, concrete, timber, steel, blockwork, glass, vinyl and carpet. The use of pre-manufactured materials is not envisaged. There will be no on-site concrete batching or sandblasting.

The duration of the construction works is predicted to be 72weeks.

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

5.3.4 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 would be no more than 10 HDV outwards movements from the Site each day. There will be no unpaved road surfaces 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 '**Small**'.

5.3.5 Summary

Table 8 below shows a summary of the potential dust emission magnitudes from each activity:

Table 8 - Potential Dust Emission Magnitude

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

5.4 Sensitivity of Area

The prevailing wind direction for the closest regionally representative meteorological measurement station to the Site, at Manchester Airport, is shown for 2019 in Appendix B. The wind rose shows that the prevailing winds are from the south. As such, receptors downwind (i.e. north) of the Site are more sensitive to dust impacts than those located upwind.

Figure 10 shows the construction phase distance buffers (20m, 50m, 100m and 350m) for the Site boundary, as well as identified high sensitivity receptor locations within these buffers.

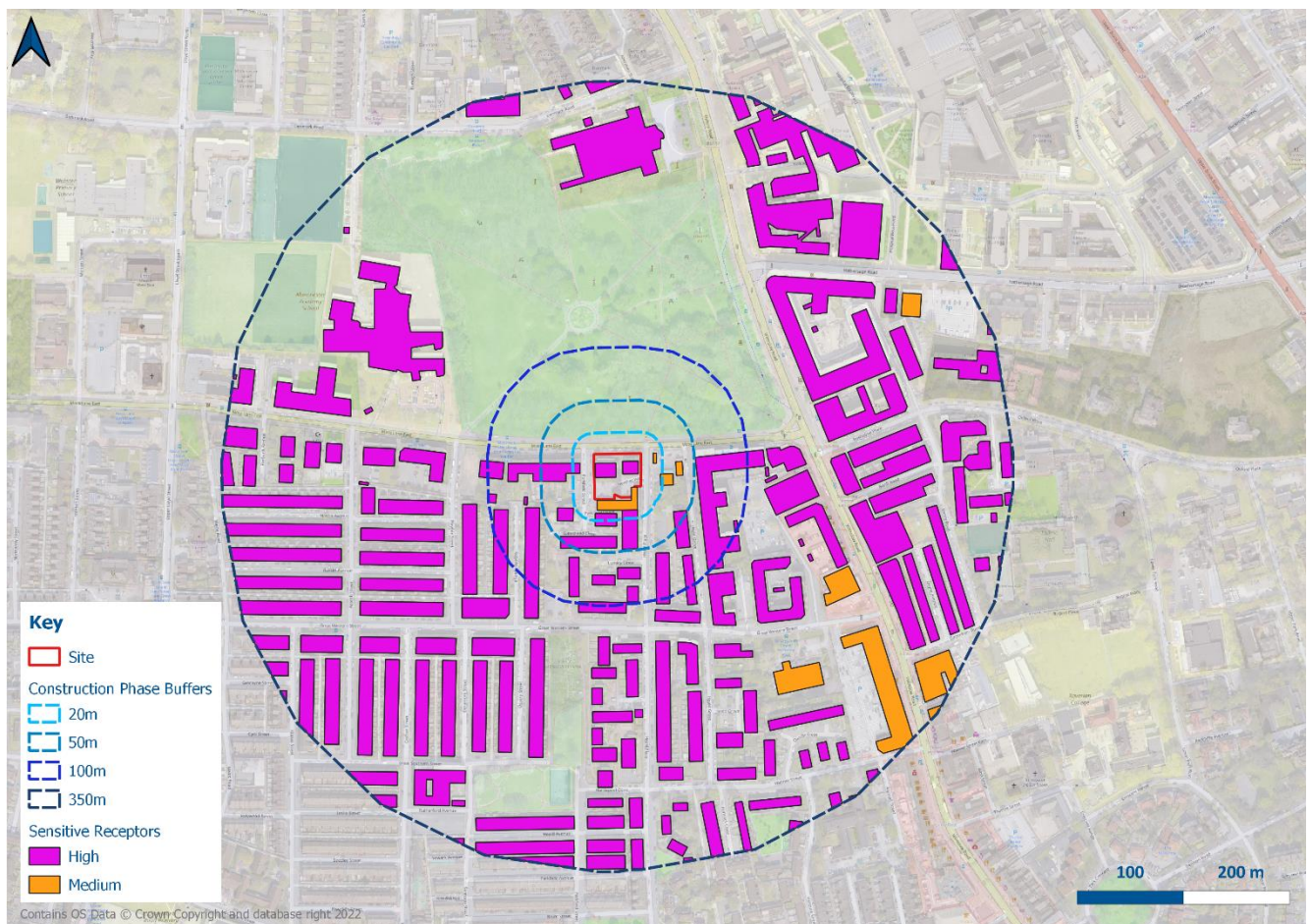


Figure 10 – Construction Phase Receptors

5.4.1 Dust Soiling Impacts

As shown in Figure 10, there are between 1-10 high sensitivity human receptors within 20m of the Site boundary and >1 medium sensitivity receptors within 20m of the Site Boundary. 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 'Medium'.

With regard to Trackout, the sensitivity for Medium size sites is assessed where receptors are located within 50m from Trackout routes up to 200m from the Site. As there are more than 10 high-sensitivity receptors within 20m of potential Trackout routes from the Site, the sensitivity to dust soiling impacts from Trackout is defined as 'High'.

5.4.2 Human Health Impacts

Defra mapped background predictions (Table 5) show that annual mean concentrations of PM₁₀ are well below 32µg/m³ in the vicinity of the Site (the concentration at which exceedance of the 24-hour AQAL is likely), and are not likely to exceed 24µg/m³, based on 2019 estimates. According to IAQM guidance, where PM₁₀ concentrations are <24µg/m³ and there are fewer than 100 high sensitivity receptors within 20m of the Site boundary, the overall sensitivity of the surrounding area to human health impacts is defined as 'Low' for all stages.

5.4.3 Ecological Impacts

There are no ecological receptors within 50m of the Site Boundary and therefore the impact of dust on ecological receptors has not been considered further.

5.4.4 Summary

The sensitivity of the surrounding area for the potential impacts discussed above are shown in Table 9 below.

Table 9 - Sensitivity of Local Area

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

5.5 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 construction phase as described above.

Table 10 provides a summary of the construction dust risk assessment. Overall, the development is considered to be **Medium Risk** for nuisance dust soiling effects and a **Low Risk** for PM₁₀ health effects in the absence of mitigation.

Table 10 - Risk of adverse impacts during construction phase

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

Section 7.1 provides site specific mitigation measures to be adopted. The IAQM guidance states that implementing these measures should effectively reduce the risk of impacts to *Negligible* during this phase. On this basis, the residual construction phase effects are considered to be 'not significant'

6. OPERATIONAL PHASE ASSESSMENT

6.1 Impacts on Future Occupants – Site Suitability

Due to the location of the Site within an AQMA and the close proximity of Moss Lane East to the Site, detailed modelling has been undertaken in order to ensure that the Site is suitable for residential use. This is in line with EPUK & IAQM guidance and the MCC AQ and Planning Technical Guidance.

Modelled annual mean NO₂, PM₁₀ and PM_{2.5} concentrations at the ground floor (1.5m) and first floor (4.5m) are shown for the discrete modelled receptors, SS1 – SS11, below in Table 11:

Table 11 - Model Predicted Annual Mean Concentrations for 2025

Receptor	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
Ground Floor			
SS1	18.1	13.1	8.7
SS2	16.9	12.7	8.5
SS3	15.8	12.4	8.3
SS4	15.8	12.4	8.3
SS5	16.2	12.5	8.4
First Floor			
SS6	17.1	12.8	8.5
SS7	17.2	12.8	8.5
SS8	16.5	12.6	8.4
SS9	15.8	12.4	8.3
SS10	15.7	12.4	8.3
SS11	16.0	12.5	8.3

As can be seen from Table 11, no exceedances of the AQALs are predicted for any pollutants across the Proposed Development in 2025. Higher concentrations of annual mean NO₂, and other pollutants, are found on the north façade of the Proposed Development facing Moss Lane East at receptor location SS1. The annual mean NO₂ concentration at SS1 is 18.1µg/m³ which is 45% of the relevant AQAL, visual representation of annual mean NO₂ concentrations can also be seen in Figure 11 below.

The annual mean PM₁₀ concentration at SS1 is 13.1µg/m³ which is 33% of the relevant AQAL and the annual mean PM_{2.5} concentration at SS1 is 8.7µg/m³ which is 44% of the relevant AQAL.

With regard to the short-term 1-hour NO₂ objective, Defra's LAQM.TG(16) states where the annual means are 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 which in accordance with EPUK & IAQM guidance is the concentrations where 24-hour mean PM₁₀ concentrations greater than 50µg/m³ are unlikely to occur more than 35 times a year.

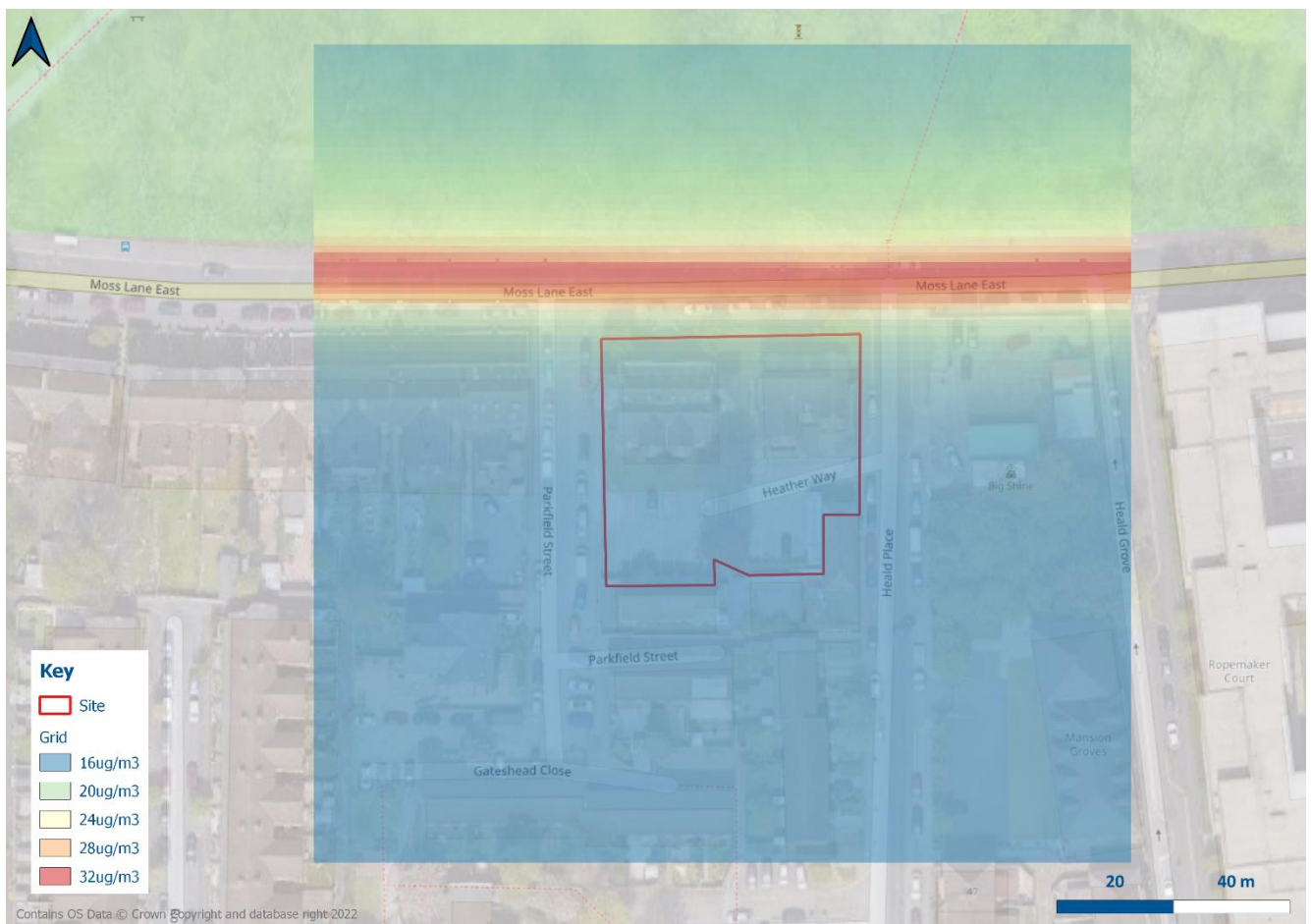


Figure 11 - Modelled NO₂ Contour Plot

The above figure demonstrates the major source of NO₂ in the area, as modelled, is Moss Lane East. Concentrations are well below the AQAL across the modelled area, dropping to approximately 18µg/m³ at the Proposed Development.

6.2 Impacts on Existing Air Quality

6.2.1 Trip Generation

The Transport Consultants for the scheme, RSK, provided the trip generation for both the existing use and Proposed Development. These are shown in the Table 12 below.

Table 12 – Trip Generation

	Arrival	Departure	Total
Proposed Development Trips (AADT)	26	27	53
Existing Development Trips (AADT)	21	21	42
Net Change in Development Trips (AADT)			11

As shown in Table 12, the net change in trips on the local road network as a result of the Proposed Development is 11 AADT. These development flows are below the criteria detailed within the EPUK & IAQM Guidance and therefore the impacts can be considered as having an insignificant effect of local air quality.

6.2.2 Energy Strategy

The energy strategy is still under development but no substantial combustions sources, such as combined heat and power (CHP), are proposed for the energy / heating strategy on-site. The proposed energy strategy is for an all electric solution with heating via Air Source Heat Pumps (ASHPs) which will be mounted at roof level. These are beneficial in terms of air quality as they do not introduce any new combustion sources or processes.

6.3 Summary

The data provided in Section 4 and Section 6.1 confirms:

- The proposal is not located within 20m from roads expected to experience pollutant concentrations at or above the relevant AQAL (determined by Defra's PCM model);
- The proposal is located within the Greater Manchester AQMA;
- Local monitoring data has measured concentrations above the annual mean NO₂ AQAL during recent years. However, there is no monitoring undertaken within the immediate vicinity of the Proposed Development;
- there are no predicted exceedances of the annual mean NO₂, PM₁₀ or PM_{2.5} AQALs as a result of the development;
- the Proposed Development will not introduce any new receptors into an area of exceedance of any relevant AQAL, including at new receptor locations of relevant exposure introduced within the Site;
- 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; and
- all modelled concentrations have been verified against MCC monitoring data.

A sensitivity assessment of the model input variables (emission factors and background concentrations) has been considered and is presented in Appendix D. However, the overall conclusion over the significance of the effect has been based upon the main body of the assessment, utilising 2025 as the development opening year. Notwithstanding, it is noted that the sensitivity assessment presented within Appendix D does not predict any exceedances of the AQALs as a result of the Proposed Development.

Based on the above, the Proposed Development is not expected to introduce new receptors into an area of poor air quality

7. MITIGATION MEASURES

7.1 Construction Phase

The qualitative construction dust risk assessment shows that the Site is **Medium Risk** for adverse impacts during construction, as a worst-case, in the absence of mitigation. The IAQM's highly recommended mitigation measures for Medium risk sites is provided at Appendix E of this report. Implementing these measures should effectively reduce the risks of construction phase impacts on the local area to Negligible.

MCC Air Quality and Planning Technical Guidance¹⁷ states the following with regards to Non-Road Mobile Machinery (NRMM) during construction:

"In addition to the IAQM guidance, MCC recommends that NRMM used on the site of any major development within Manchester city centre for the purpose of construction or demolition works should meet Stage IV of EU directive 97/68/EC, and Stage IIIA as a minimum."

7.2 Operational Phase – Road Sources

7.2.1 Travel Plan Measures

The Travel Plan associated with the development will also contain measures such as encourage sustainable modes of transport and discourage the use of car travel. These measures provide an opportunity to promote and establish sustainable modes of transport which will help to reduce potential air quality impacts.

7.3 Ventilation Strategy

It is understood that natural ventilation is the proposed ventilation strategy for the Site. This is considered appropriate based on the results of the AQA.

8. DISCUSSION AND CONCLUSION

Hydrock were commissioned by CS Moss Lane East Limited to prepare an AQA to support the planning application for a PBSA development on land at 466 – 472 Moss Lane East, Manchester.

A qualitative construction dust risk assessment has been undertaken in line with IAQM guidance. 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.

Modelled UK-AIR background, Defra PCM roadside concentrations, and local air quality monitoring data have been used to establish baseline air quality at the Site and surrounding locale. Reviewing this data highlighted that local monitoring is not located within the immediate development locale. The Site is located within the GM AQMA and CAZ. Moreover, predicted **background concentrations** of NO₂, PM₁₀ and PM_{2.5} at the Site and surrounding locale **are all below the relevant AQALs**.

A qualitative operational phase assessment has been undertaken by following screening criteria provided in EPUK & IAQM guidance. Vehicle traffic movements generated by the Proposed Development are below the relevant EPUK & IAQM guidance criteria 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 MCC Planning Policies.

A site suitability assessment has been produced due to the location of the Site, within an AQMA. The emissions generated from traffic travelling along Moss Lane East and the Wilmslow Road were modelled for NO₂, PM₁₀ and PM_{2.5} using the latest version of ADMS-Urban (version 5.1). The results of this exposure modelling demonstrated that in 2025, the opening year for the development, there are not predicted to be any exceedances of the AQAL at the Proposed Development.

Based on the assessment, the Proposed Development is not expected to introduce new receptors into an area of poor air quality. As such, air quality does not present a constraint at this Site. From the evidence presented, the Proposed Development is expected to 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

Trip generated by the proposals were supplied by RSK, the transport consultant for the Proposed Development. As stated in Section 3.5.4.1, traffic data from the DfT matrix was utilised for both the site suitability assessment and the model verification. Traffic data utilised is shown in below in Table 13 and Table 14.

Table 13 - Traffic Data – Model Verification

Link ID	Road Link	Speed (kph)	2019 Model Verification	
			AADT	% HDV
V1	Hyde Road	48	18,305	4.9
V2_Cars	Hyde Road	48	17,883	2.7
V2_Bus Lane	Hyde Road (bus lane)	40	422	100
V3_Car	Hyde Road	48	17,883	2.7
V3_Bus Lane	Hyde Road (bus lane)	40	422	100

Table 14 - Traffic Data – Site Suitability

Link ID	Road Link	Speed (kph)	2025 DS	
			AADT	% HDV
L1	Moss Lane East	32	11,109	2.9
L2	Wilmslow Road (south of Moss Lane East)	32	12,636	10.2
L3	Wilmslow Road (north of Moss Lane East)	32	12,636	10.2
L4	Oxford Road (buses and taxi only)	32	1,172	100

Appendix B – Meteorological data

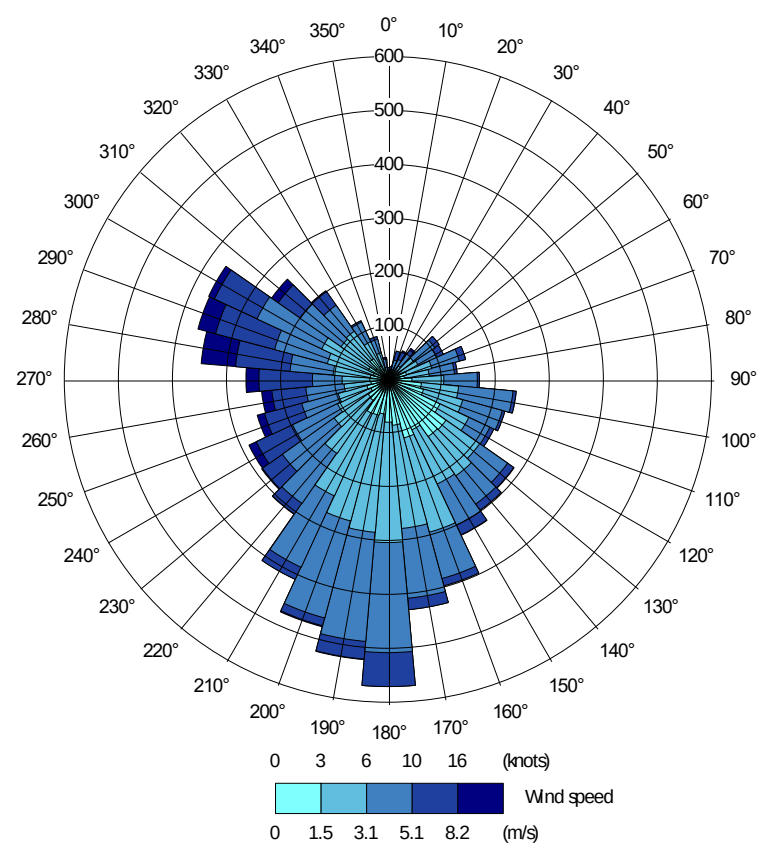


Figure 12 –2019 Meteorological Data for Manchester Airport

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 (16), the difference between modelled results and monitored concentrations is acceptable where it is within 25% (10% is preferable).

Monitoring Locations used for Verification:

MCC monitoring location MA88NO was selected for model verification. This location was the closest to the study area and adjacent to an arterial route out of Manchester, for which traffic data was available. There were no other suitable tubes in the vicinity of the Site. The EHO at MCC was emailed to confirm the use of this monitoring location, but to date no response has been received.

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 website³².

The pre-adjusted modelled and monitored verification results are given in Table 15.

Table 15 - 2019 Modelled and monitored results

Monitoring ID	Modelled NO_x ($\mu\text{g}/\text{m}^3$)	Monitored NO_x ($\mu\text{g}/\text{m}^3$)	Ratio Modelled/ Monitored	Modelled NO_2 ($\mu\text{g}/\text{m}^3$)	Monitored NO_2 ($\mu\text{g}/\text{m}^3$)	Difference (%)
MA88NO	17.0	50.8	2.992	27.7	43.3	-35.9

As shown, the model was underpredicting. As such, an adjustment factor of **2.992** has been applied to dispersion model results.

As there is insufficient PM_{10} or $\text{PM}_{2.5}$ monitoring data in the study area, it was not possible to perform model verification for these pollutants. As such, the NO_2 adjustment factor has also been applied to PM_{10} and $\text{PM}_{2.5}$ model results, in accordance with LAQM.TG(16).

³² Defra, “ NO_x to NO_2 Calculator” (Defra, 2019), <http://laqm.defra.gov.uk/documents/NOx-NO2-Calculator-v8.1.xls>.

Appendix D – Results of Sensitivity analysis

The result of the sensitivity analysis performed of the ADMS-Urban modelling study are shown below. This used 2019 emission factors and 2019 UK-AIR background concentrations.

Table 16 – Results of 2019 Sensitivity Analysis

Receptor	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
Ground Floor			
SS1	24.7	14.0	9.3
SS2	22.4	13.6	9.1
SS3	20.5	13.3	8.9
SS4	20.4	13.3	8.9
SS5	21.1	13.4	9.0
First Floor			
SS6	22.8	13.7	9.1
SS7	22.9	13.7	9.2
SS8	21.7	13.5	9.0
SS9	20.3	13.3	8.9
SS10	20.2	13.2	8.9
SS11	20.8	13.3	8.9

Appendix E - Construction Dust Mitigation for Medium Risk sites

In order to mitigate the worst-case dust impacts the following mitigation measures are highly recommended by the IAQM for Medium Risk construction sites.

Highly Recommended

Communications

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

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exception 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.

Monitoring

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of 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 is a large site, before work on a phase commences

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as 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.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

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 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

- 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.

Construction

- 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.

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 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 bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior 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 10m from receptors where possible.