Air Quality Assessment

Store Street, Manchester

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Executive Summary

Redmore Environmental Ltd was commissioned by M1 Developments Ltd to undertake an Air Quality Assessment in support of a residential development on land off Store Street, Manchester.

An Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the proposed development;
- Assess potential impacts associated with road transport emissions during the operational phase of the proposed development;
- Assess risk of future resident exposure to any existing air quality issues; and,
- Identify any requirement for relevant mitigation measures.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of earthworks, construction and trackout activities. It is considered that the use of the identified site-specific control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

During the operational phase of the development there is the potential for air quality impacts as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed using standard screening criteria. Due to the number of vehicle trips generated by the proposals, road traffic exhaust impacts were not predicted to be significant.

There is the potential for the exposure of future residents to elevated pollution levels. Dispersion modelling was therefore undertaken in order to predict concentrations across the proposed site as a result of emissions from the highway network. Results were subsequently verified using local monitoring data.

The results of the dispersion modelling assessment indicated that predicted pollutant levels were below the relevant criteria across the development. As such, the site is considered suitable for the proposed end use from an air quality perspective.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

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1.0 INTRODUCTION

1.1 Instruction

1.1.1 Redmore Environmental Ltd was commissioned by M1 Developments Ltd to undertake an Air Quality Assessment in support of a residential development on land off Store Street, Manchester.

1.2 Site Location and Context

1.2.1 The site is located on land off Store Street, Manchester, at approximate National Grid Reference (NGR): 384984, 398075. The relevant Local Authority (LA) is Manchester City Council (MCC). Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the erection of a 16 storey building comprising 73 apartments (Use Class C3) with associated residential facilities, 2 car parking spaces and 57 cycle parking spaces, landscaping and access.

1.3 Assessment Scope

1.3.1 The proposals have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the development;
- Assess potential impacts associated with road transport emissions during the operational phase of the development;
- Assess risk of future resident exposure to any existing air quality issues; and,
- Identify the requirement for relevant mitigation measures.

1.3.2 This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values have also been provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023[1]. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

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

[1] AQS: Framework for Local Authority Delivery, DEFRA, 2023.

[2] Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 Table 1 presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Interim Target/Concentration Target

Pollutant	Air Quality Objective/Interim Target/Concentration Target	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	12(a)	Annual mean
	10(b)	Annual mean

Note: (a) Interim Target to be achieved by end of January 2028.
(b) Concentration Target to be achieved by 2040.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance[3] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

[3] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 Local Air Quality Management

2.2.1 LAs are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Dust

2.3.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> "any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework[4] (NPPF) was published in December 2024 and amended in February 2025. The document sets out the Government's planning policies for England and how these are expected to be applied.

2.4.2 The purpose of the planning system is to contribute to the achievements of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

> "c) an environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

> "Planning policies and decisions should contribute to and enhance the natural and local environment by:
>
> […]
>
> e) preventing new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of

[4] NPPF, Ministry of Housing, Communities and Local Government, 2024.

soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]"

2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

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

2.4.5 The implications of the NPPF have been considered throughout this assessment.

2.5 National Planning Practice Guidance

2.5.1 The National Planning Practice Guidance[5] (NPPG) web-based resource was launched by the Department for Communities and Local Government to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality be relevant to the planning development management process?
6. What specific issues may need to be considered when assessing air quality impacts?

[5] https://www.gov.uk/guidance/air-quality--3.

7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

2.5.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.6 Regional Planning Policy

2.6.1 The Places for Everyone Plan (PfEP)[6] was produced by the nine Greater Manchester Combined Authorities (GMCAs) of Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan, and became part of the statutory development plan for each of the Councils on 21st March 2024.

2.6.2 A review of the PfEP indicated the following policies of relevance to air quality that have been considered throughout this assessment:

> "Policy JP:S5: Clean Air
>
> A comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met, including:
>
> 1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;
> 2. Determining planning applications having regard to the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;
> 3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air

[6] PfEP, GMCA, 2024.

quality can be fully assessed and development only permitted where they are acceptable and/or suitable mitigation can be provided;
4. Restricting developments that would generate significant point source pollution such as some types of industrial activity and energy generation;
5. Significantly expanding the existing commercial network of electric vehicle charging points, both for public and private use, including as part of new developments;
6. Implementing the Clean Air Plan and associated measures;
7. Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;
8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;
9. Controlling traffic and parking within and around schools, early years sites and other locations that are particularly sensitive to air quality;
10. Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and,
11. Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users."

"Policy JP-P1 Sustainable Places

We aim to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having the following key attributes that all development, wherever appropriate, should be consistent with:

[…]

15. Comfortable and inviting, with indoor and outdoor environments:

A. Offering a high level of amenity that minimises exposure to pollution; and,

[…]."

2.6.3 The above policies were taken into consideration throughout the undertaking of the assessment.

2.7 Local Planning Policy

2.7.1 The Manchester Local Plan consists of a series of planning documents of which the Core Strategy Development Plan Document (DPD)[7] is central. This was adopted by MCC on 11th July 2012.

2.7.2 Review of the Core Strategy DPD indicated the following policies of relevance to the assessment:

> "Policy EN 16 Air Quality
>
> 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 effect 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 effects on air quality, alongside other plan objectives. This includes cumulative effects, particularly in Air Quality Management Areas."
>
> "Policy DM 1 Development Management
>
> All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:
>
> […]

[7] Core Strategy DPD, MCC, 2012.

Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise."

2.7.3 MCC has also produced the 'Air Quality & Planning Technical Guidance' Document'[8] which provides guidance on assessing the impact of proposed development on air quality.

2.7.4 The above policies and guidance were taken into consideration throughout the undertaking of the assessment.

2.8 Greater Manchester Clean Air Plan

The UK Government has instructed a number of LAs to take rapid action to reduce harmful roadside levels of NO_2 within their areas of jurisdiction in the quickest possible timeframe. The GMCA and Transport for Greater Manchester (TfGM) have collaborated to develop a Clean Air Plan (CAP) to ensure Greater Manchester achieves compliance with the relevant AQOs for NO_2 by 2026 at the latest. The initial CAP proposal included implementation of a Class C charging Clean Air Zone. The GMCA has subsequently updated the CAP proposals[9] to comprise an investment-led, non-charging approach. This was approved by the UK Government on 23rd January 2025. The implications of the CAP were taken into account during the undertaking of this assessment.

8 Air Quality & Planning Technical Guidance, MCC, 2022.

9 Case for a New GM Clean Air Plan, GMCA and TfGM, 2022.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future residents to elevated pollution levels. These factors were assessed in accordance with the following methodology.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V2.2'[10].

3.2.2 Activities on the proposed construction site have been divided into three types to reflect their different potential impacts. These are:

- Earthworks;
- Construction; and,
- Trackout.

3.2.3 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM_{10}.

3.2.4 The assessment steps are detailed below.

[10] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

Step 1 - Screen the Need for an Assessment

3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m from the boundary or 50m from the construction vehicle route up to 250m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 250m from the site entrance, then the assessment also proceeds to Step 2.

3.2.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2 - Assess the Risk of Dust Impacts

3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.2.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Earthworks	• Total site area greater than 110,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 6m in height

Magnitude	Activity	Criteria
	Construction	• Total building volume greater than 75,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Earthworks	• Total site area 18,000m^2 to 110,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 3m to 6m in height
	Construction	• Total building volume 12,000m^3 to 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 20 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Earthworks	• Total site area less than 18,000m^2 • Soil type with large grain size (e.g. sand) • Less than 5 heavy earth moving vehicles active at any one time • Formation of bunds less than 3m in height
	Construction	• Total building volume less than 12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 20 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

3.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The sensitivities of specific receptors are shown in Table 4.

Table 4 Construction Dust - Sensitivities of People and Ecological Receptors

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10}. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Sites of Special Scientific Interest
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.11 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Table 5 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.12 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6 Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Background Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32µg/m^3	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low

Receptor Sensitivity	Background Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
	24 - 28µg/m³	More than 10	Low	Low	Low	Low
		1 -10	Low	Low	Low	Low
	Less than 24µg/m³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low

3.2.13 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 7 Construction Dust - Sensitivity of the Area to Ecological Impacts

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

3.2.14 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

3.2.15 Table 8 outlines the risk category from earthworks, construction and trackout activities.

Table 8 Construction Dust - Dust Risk Category from Earthworks, Construction and Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Step 3 - Site-specific Mitigation

3.2.16 Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance[11] to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4 - Determine Significant Effects

3.2.17 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

3.2.18 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The IAQM guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

Potential Development Impacts

3.3.1 The development has the potential to increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. An assessment was therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[12] guidance to determine the potential for trips generated by the development to affect local air quality.

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

[11] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

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

- The development leads to a change of Light Duty Vehicle (LDV) flows of:
  - More than 100 Annual Average Daily Traffic (AADT) within an AQMA;
  - More than 500 AADT outside of an AQMA;
- The development leads to a change of HDV flows of:
  - More than 25 AADT within an AQMA;
  - More than 100 AADT outside of an AQMA;
- Introduce a new junction that would cause traffic flow to change behaviour with respect to acceleration/deceleration or introduce queueing traffic where there previously wasn't any (such as a roundabout or traffic lights); and,
- Introduce one or more significant combustion processes where there is a risk of impact to relevant receptors.

3.3.3 Should these criteria not be met, then the IAQM guidance[13] considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

Potential Future Exposure

3.3.4 The proposals have the potential to expose future residents to elevated pollution levels. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site, detailed dispersion modelling was undertaken. Reference should be made to Appendix 1 for a full description of the assessment input data.

3.3.5 The dispersion modelling results were compared against the relevant AQOs and Concentration Target in order to determine the potential for exposure of future residents to elevated pollutant concentrations and identify appropriate mitigation, if necessary.

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

4.0 BASELINE

4.1 Introduction

4.1.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), MCC has undertaken Review and Assessment of air quality within its area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 are above the AQO within the city. As such, a number of roads within Manchester have been included within the GMCA AQMA. This is described as follows:

> "This is the part of the Greater Manchester Combined Authority AQMA located within the Manchester City Council area."

4.2.2 The development is located within the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

4.2.3 MCC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant levels is undertaken by MCC throughout its area of jurisdiction. Data has also been collected by the GMCA to inform the CAP. Recent NO_2 concentrations recorded in the vicinity of the development, as provided in GMCA's '2024

Air Quality Annual Status Report (ASR)'[14] and 'CAP NO_2 Diffusion Tube Results 2011-2024'[15], are shown in Table 9. Exceedences of the relevant AQO are shown in **bold**.

Table 9 Monitoring Results - NO_2

Monitoring Site		Monitored Annual Mean NO_2 Concentration (µg/m³)			
		2021	2022	2023	2024
MAN71NO	Great Ancoats Street	34.2	34.4	30.7	29.0
CAP_MANC_012	A665 (Great Ancoats Street)	**42.9**	38.5	36.7	38.5
CAP_MANC_013	A665 (Great Ancoats Street)	**40.8**	**51.2**	**48.2**	**50.0**
CAP_MANC_014	A665 (Great Ancoats Street)	**40.0**	**43.0**	39.5	39.2

4.3.2 As shown in Table 9, the annual mean NO_2 concentration was above the AQO of 40µg/m³ at CAP_MANC_013 and CAP_MANC_014 during recent years and at CAP_MANC_012 in 2021. The annual mean NO_2 concentration was below the AQO of 40µg/m³ at the MAN71NO monitoring location in recent years. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 Pollutant concentrations recorded during 2021 were affected by changes to travel patterns associated with the COVID-19 pandemic. The results should therefore be viewed with caution. However, data for 2022 and beyond is now considered representative of post-pandemic conditions. This is supported by the IAQM[16], who have adopted the following position:

> "ambient air quality monitoring data for the year 2022 and beyond is generally considered to represent the current post-pandemic baseline".

4.3.4 Monitoring of PM_{10} and $PM_{2.5}$ concentrations is not undertaken within the vicinity of the site.

[14] 2024 Air Quality ASR, GMCA, 2025.

[15] Greater Manchester LAQM and CAP NO_2 Diffusion Tube Results 2011-2024, GMCA, 2024.

[16] Use of 2020 and 2021 Monitoring Datasets - IAQM Position Statement V1.1, IAQM, 2023.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 384500, 398500. Data for this location was downloaded from the DEFRA website[17] for the purpose of the assessment and is summarised in Table 10.

Table 10 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2024	2025	2027
NO_2	22.22	21.45	20.01
PM_{10}	14.34	14.30	14.18
$PM_{2.5}$	8.01	7.96	7.84

4.4.2 As shown in Table 10, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs and Concentration Target at the proposed development site.

4.5 Sensitive Receptors

4.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 250m from the development boundary. These are summarised in Table 11.

Table 11 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	1
Up to 50	More than 100	1
Up to 100	More than 100	-

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

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 250	More than 100	-

4.5.2 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 250m of the site access. These are summarised in Table 12.

Table 12 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	1
Up to 50	More than 100	1

4.5.3 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties.

4.5.4 The ecological receptor identified in Table 11and Table 12 is the Ashton Canal (West) Site of Biological Importance (SBI), located approximately 20m north-east of the site. Based on the criteria shown in Table 4, the sensitivity of the ecological receptor to potential dust effects was determined as **low**. This was because the designation is a locally designated site. Reference should be made to Figure 3 for a map of the designation extent.

5.0 CONSTRUCTION PHASE ASSESSMENT

5.1 Introduction

5.1.1 There is the potential for air quality impacts as a result of the construction of the proposed development. These are assessed in the following Sections.

5.2 Step 1 - Screen the Need for an Assessment

5.2.1 The undertaking of activities such as excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.

5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

5.3 Step 2a - Define the Potential Dust Emission Magnitude

Earthworks

5.3.1 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed site is less than 18,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

Construction

5.3.2 Due to the size of the development, the total building volume is likely to be between 12,000m^3 and 75,000m^3 In accordance with the criteria outlined in Table 3, the magnitude

of potential dust emissions from construction is therefore **medium**.

Trackout

5.3.3 Based on the site area, it is anticipated that the unpaved road length will be less than 50m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **small.**

5.4 Step 2b - Define the Sensitivity of the Area

Dust Soiling

5.4.1 Table 11 shows that there are more than 100 **high** sensitivity receptors within 20m of the site boundary. The sensitivity of the area with respect to dust soiling from earthworks and construction, as defined using the criteria summarised in Table 5, is therefore considered to be **high**.

5.4.2 Table 12 shows that there are more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to dust soiling from trackout, as defined using the criteria summarised in Table 5, is therefore considered to be **high**.

Human Health

5.4.3 As shown in Table 10, the 2025 annual mean PM_{10} background concentration at the site is 14.30µg/m^3. As shown in Table 6, where the background annual mean PM_{10} concentration is below 24µg/m^3 and there are more than 100 **high** sensitivity receptors within 20m of the site boundary, the sensitivity of the area to potential human health impacts from earthworks and construction is **medium**.

5.4.4 There are more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to human health from trackout, as defined using the criteria in Table 6, is therefore considered to be **medium.**

Ecological

5.4.5 There is one ecological receptor within 20m of the site boundary. The sensitivity of the area with respect to ecological impacts from earthworks, construction and trackout as defined using the criteria summarised in Table 7, is therefore considered to be **low**.

5.5 Step 2c - Define the Risk of Dust Impacts

5.5.1 The derived dust emission magnitude for each activity has been combined with the sensitivity of the area to determine the risk of unmitigated impacts in line with the methodology set out in Table 8. A summary of the risk from each dust generating activity is provided in Table 13.

Table 13 Summary of Potential Unmitigated Dust Risks

Potential Impact	Activity	Step 2A - Dust Emission Magnitude	Step 2B - Sensitivity of the Area	Step 2C - Risk
Dust Soiling	Earthworks	Small	High	Low
	Construction	Medium	High	Medium
	Trackout	Small	High	Low
Human Health	Earthworks	Small	Medium	Low
	Construction	Medium	Medium	Medium
	Trackout	Small	Medium	Low
Ecological	Earthworks	Small	Low	Negligible
	Construction	Medium	Low	Low
	Trackout	Small	Low	Negligible

5.5.2 As indicated in Table 13, the potential risk of dust soiling and human health impacts is **medium** from construction and **low** from earthworks and trackout. The potential risk of ecological impacts is **low** from construction and **negligible** from earthworks and trackout.

5.5.3 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each

sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

5.6 Step 3 - Site-specific Mitigation

5.6.1 The IAQM guidance[18] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 14. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the LA.

Table 14 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan, which may include measures to control other emissions, approved by the LA
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 LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book • Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary
Monitoring	• Undertake daily on-site and off-site inspection, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the LA when asked • Carry out regular site inspections, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions

[18] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

Issue	Control Measure
Site preparation	• 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 • Fully enclose site or specific operations where there is a high potential for dust production and they are 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 • 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 • Produce a Construction Logistics Plan
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires or burning of waste materials
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stores in silos
Trackout	• Use water-assisted dust sweeper on access and local roads, if required • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials • Implement a wheel washing system, if required • Access gates to be located at least 10m from receptors where possible

5.7 Step 4 - Determine Significant Effects

5.7.1 Assuming the relevant mitigation measures outlined in Table 14 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance[19].

[19] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

6.0 OPERATIONAL PHASE ASSESSMENT

6.1 Introduction

6.1.1 There is the potential for air quality impacts as a result of the operation of the proposed development. These are assessed in the following Sections.

6.2 Potential Development Impacts

6.2.1 Any vehicle movements associated with the development will generate exhaust emissions on the local and regional road networks. Information provided by Rappor, the Transport Consultants for the scheme, indicated the development is predicted to generate 67 additional daily LDV movements, and no HDV movements.

6.2.2 Based on the above information, the scheme is not predicted to result in an increase in LDV flows of more than 100 AADT within an AQMA, or HDV flows of more than 25 AADT within the AQMA. Additionally, the proposals do not include significant highway realignment or the introduction of a junction. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM[20] screening criteria shown in Section 3.3

6.3 Potential Future Exposure

6.3.1 The proposals have the potential to expose future residents to elevated pollution levels as a result of road vehicle exhaust emissions in the vicinity of the site. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions across the development. Reference should be made to Figures 4 to 6 for graphical representations of predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations.

6.3.2 As shown in Figure 4, annual mean NO_2 concentrations were predicted to be below the AQO of 40µg/m^3 across the site. The maximum level was 24.63µg/m^3.

6.3.3 As shown in Figure 5, annual mean PM_{10} concentrations were predicted to be below the AQO of 40µg/m^3 across the site. The maximum level was 15.16µg/m^3.

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

6.3.4 As shown in Figure 6, annual mean $PM_{2.5}$ concentrations were predicted to be below the Concentration Target of 10µg/m^3 across the site. The maximum level was 8.45µg/m^3.

6.3.5 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs and Concentrations Target. As such, the site is considered suitable for the proposed use from an air quality perspective.

6.4 Interim Planning Guidance for $PM_{2.5}$

6.4.1 Interim Planning Guidance[21] on the consideration of the $PM_{2.5}$ targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise $PM_{2.5}$ and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 15.

Table 15 Interim Planning Guidance Questions

Question	Response
How has exposure to $PM_{2.5}$ been considered when selecting the development site? Factors to consider include: • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these • Site proximity to pollution sources and the impact of these on users of the development • Exposure and emissions during both construction and in-use	The proposals are located in a predominantly residential setting within Manchester city centre. As such, the site is in close proximity to a large population comprising local residents and businesses. However, as outlined in Section 6.3, emissions from the site are unlikely to have an effect on existing air quality conditions at these receptors The site is adjacent to Store Street and within 250m of the A665 Great Ancoats Street and associated road vehicle exhaust emissions. However as shown in Section 6.3, annual mean $PM_{2.5}$ concentrations are predicted to be below the Concentration Target of 10µg/m^3. As such, users of the development are unlikely to be exposed to any existing air quality issues As outlined in Table 14, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations

[21] https://uk-air.defra.gov.uk/pm25targets/planning.

Question	Response
What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of $PM_{2.5}$ and its precursors? Factors to consider include: • Site layout • The development's design • Technology used in the construction or installed for use in the development • Construction and future use of the development	The proposed apartment building is located on Store Street and set back in line with other residential buildings along this road. This limits the potential for exposure of future residents to $PM_{2.5}$ emissions In order to reduce emissions of $PM_{2.5}$ with associated impacts at nearby receptors, the following measures have also been included: • Provision of 57 secure cycle spaces to encourage the use of sustainable transport modes; • Provision of one Electric Vehicle (EV) charging point to encourage the uptake of low emission vehicles; and • Provision of Air Source Heat Pumps to generate electricity for the development. Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities

6.4.2 Based on the responses provided in Table 15 and the assessment results, as outlined in Sections 5.0 and 6.0, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of $PM_{2.5}$.

7.0 MITIGATION

7.1.1 A number of mitigation measures have been included within the development to encourage the use of sustainable transport modes, manage vehicle flow and reduce pollution around the site. These are in accordance with MCC's 'Air Quality and Planning Technical Guidance'[22], which is based upon the Good Practice Design Principles outlined in the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[23]. Table 16 describes the good practice principles along with how each has been addressed with regards to the proposals.

Table 16 Good Practice Design Principles for Operational Phase Air Quality Impacts

Phase	Principle	Action
Design Phase	New developments should not contravene the Council's AQAP[24], or render any of the measures unworkable	It is confirmed that the proposals will not contravene MCC's AQAP, or render any of the measures unworkable
	Wherever possible, new developments should not create a new "street canyon", or a building configuration that inhibits effective pollution dispersion	The development will create a new street canyon on one side of the road, As summarised in Section 6.0, the development is not predicted to lead to pollutant concentrations above the relevant criteria
	Delivering sustainable development should be the key theme of any application	The proposals have been designed to encourage sustainable behaviours, such as active and public transport due to its proximity to local bus routes and amenities, as well as the provision of cycle storage
Operational Phase	The provision of at least 1 EV "rapid charge" point per 10 residential dwellings and/or 1,000m^2 of commercial floor space. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made	EV charging is proposed as part of the development

22 Air Quality & Planning Technical Guidance, MCC, 2022.

23 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

24 Greater Manchester AQAP 2016-2021, GMCA, 2016.

Phase	Principle	Action
	Where development generates significant additional traffic, provision of a detailed Travel Plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety	The associated Travel Plan will include measures to encourage sustainable transport
	All gas-fired boilers to meet a minimum standard of <40mgNO_x/kWh. All gas-fired CHP plant to meet a minimum emissions standard of: • Spark ignition engine: 250mgNO_x/Nm^3; • Compression ignition engine: 400mgNO_x/Nm^3; • Gas turbine: 50mgNO_x/Nm^3. A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of: • Solid biomass boiler: 275mgNO_x/Nm^3 and 25mgPM/Nm^3	Air Source Heat Pumps are proposed as part of the energy strategy. There will be not gas fired plant.

7.1.2 It is considered the above methods would further reduce potential impacts associated with the scheme. Specific mitigation suited to the proposals may be stipulated as a planning condition if deemed necessary by the LA.

8.0 CONCLUSION

8.1.1 Redmore Environmental Ltd was commissioned by M1 Developments Ltd to undertake an Air Quality Assessment in support of a residential development on land off Store Street, Manchester.

8.1.2 The development may lead to adverse air quality impacts at sensitive locations during the construction and operational phases, as well as the exposure of future residents to any existing air quality issues at the site. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider location suitability for the proposed end-use and assess potential effects associated with the scheme.

8.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Site-specific dust control measures were subsequently determined. Following implementation, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities are predicted to be **not significant**.

8.1.4 During the operational phase of the proposed development there is the potential for road traffic exhaust emission impacts associated with vehicles travelling to and from the site. These were assessed using the IAQM screening criteria. Due to the number of vehicle trips generated by the proposals, road traffic exhaust impacts were predicted to be **not significant**.

8.1.5 The proposal has the potential to expose future residents to elevated pollution levels. Dispersion modelling was therefore undertaken using ADMS-Roads in order to predict concentrations as a result of emissions from the highway network. Results were subsequently verified using local monitoring data.

8.1.6 The results of the dispersion modelling assessment indicated that predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were below the relevant AQOs and Concentration Target across the development. As such, the site is considered suitable for the proposed end use from an air quality perspective.

8.1.7 Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

9.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
ASR	Annual Status Report
CAP	Clean Air Plan
CERC	Cambridge Environmental Research Consultants
CEMP	Construction Environmental Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
DPD	Development Plan Document
EV	Electric Vehicle
GMCA	Greater Manchester Combined Authority
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
MCC	Manchester City Council
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
PfEP	Places for Everyone Plan
SBI	Site of Biological Importance
TfGM	Transport for Greater Manchester
z_0	Roughness length

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location Plan

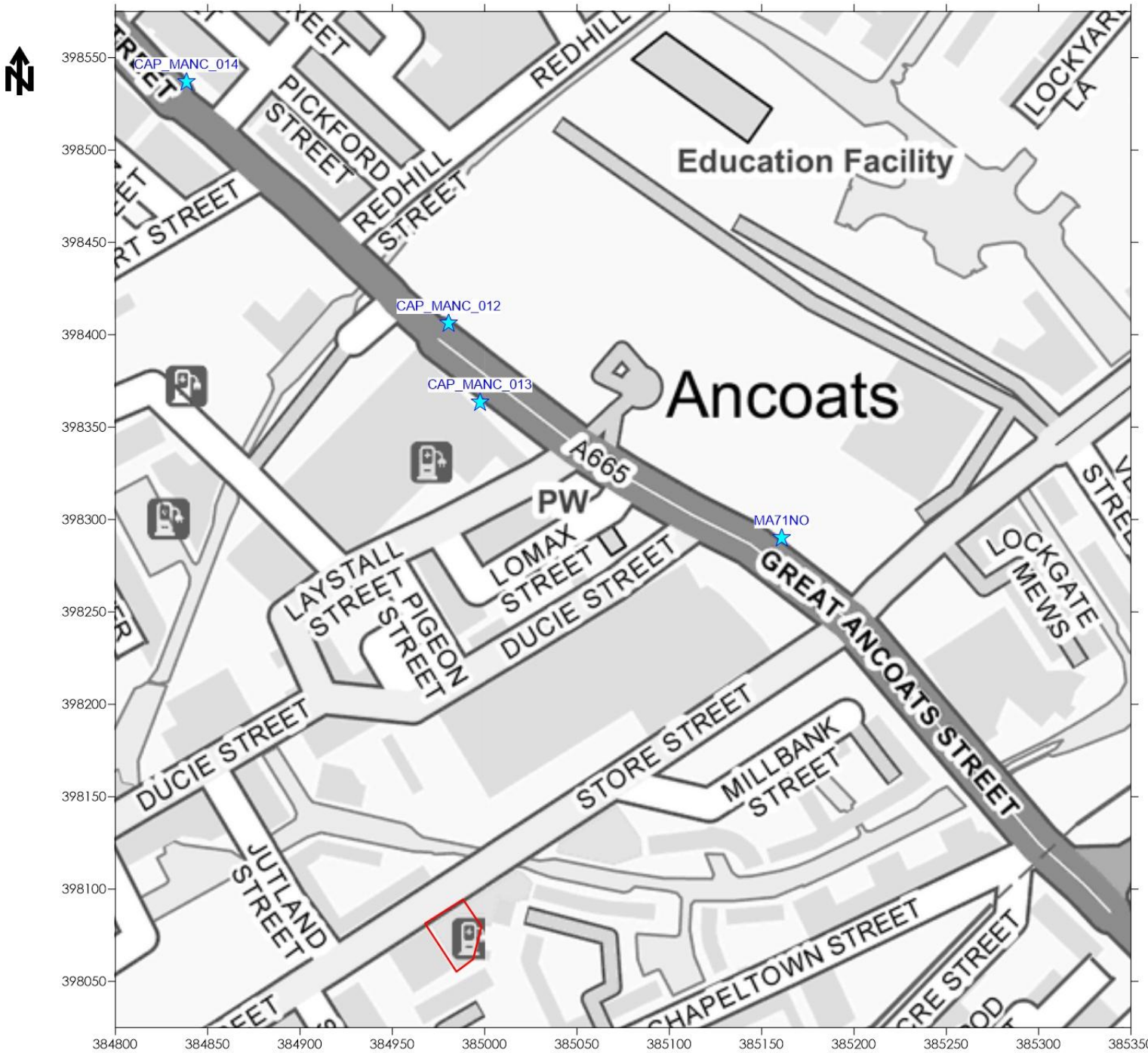
Project
Air Quality Assessment
Store Street, Manchester

Project Reference
9744

Client
Shaw Street Homes Developments Limited

Contains Ordnance Survey Data
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Legend

Site Boundary

Monitoring

Title
Figure 2 - Local Monitoring

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Air Quality Assessment
Store Street, Manchester

Project Reference
9744

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Legend

Site Boundary

Ecological Designation

Title
Figure 3 - Ecological Designation

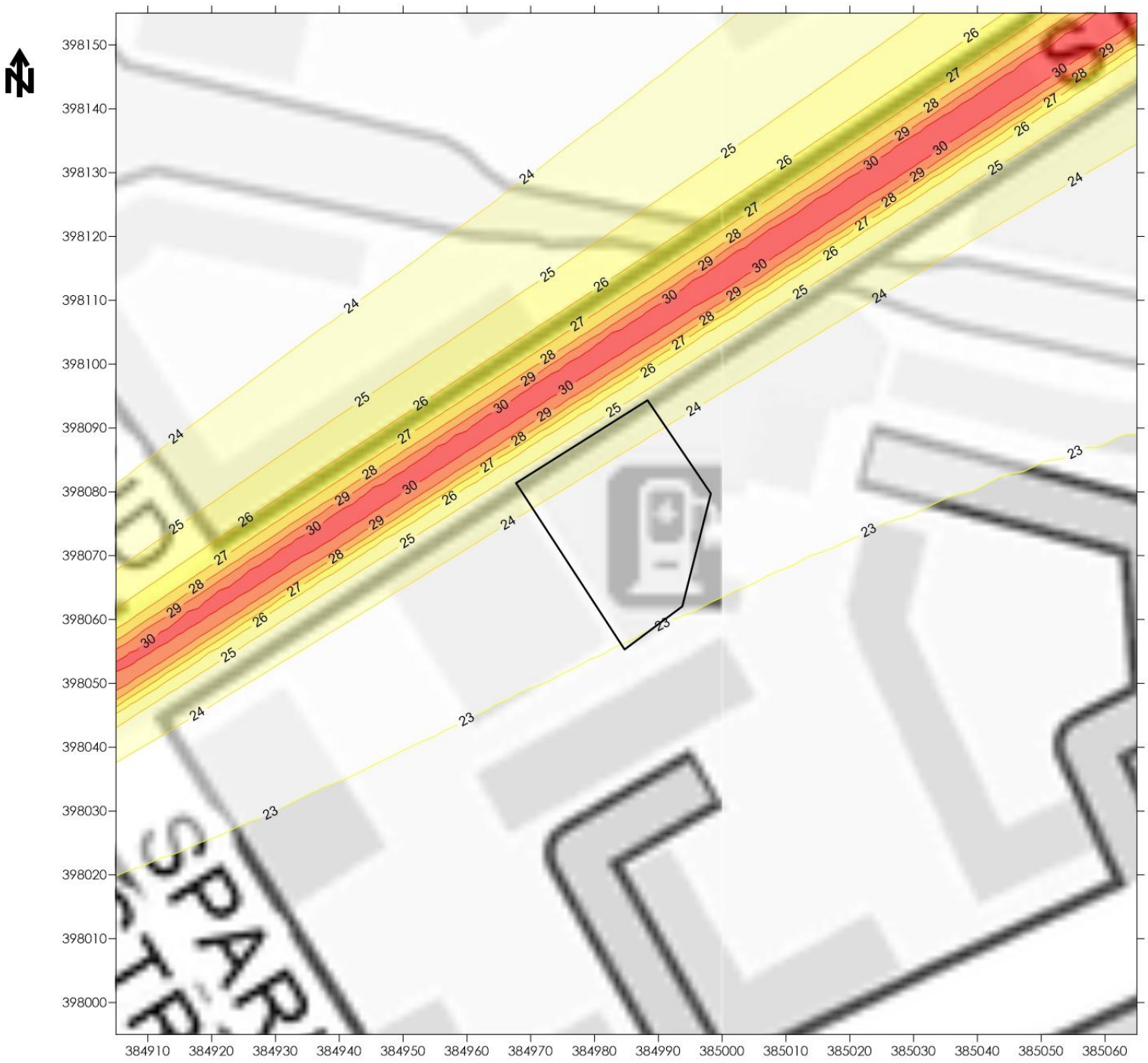
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Legend

Site Boundary

Annual Mean NO_2 Concentrations ($\mu g/m^3$)

30
29
28
27
26
25
24
23

Title
Figure 4 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)

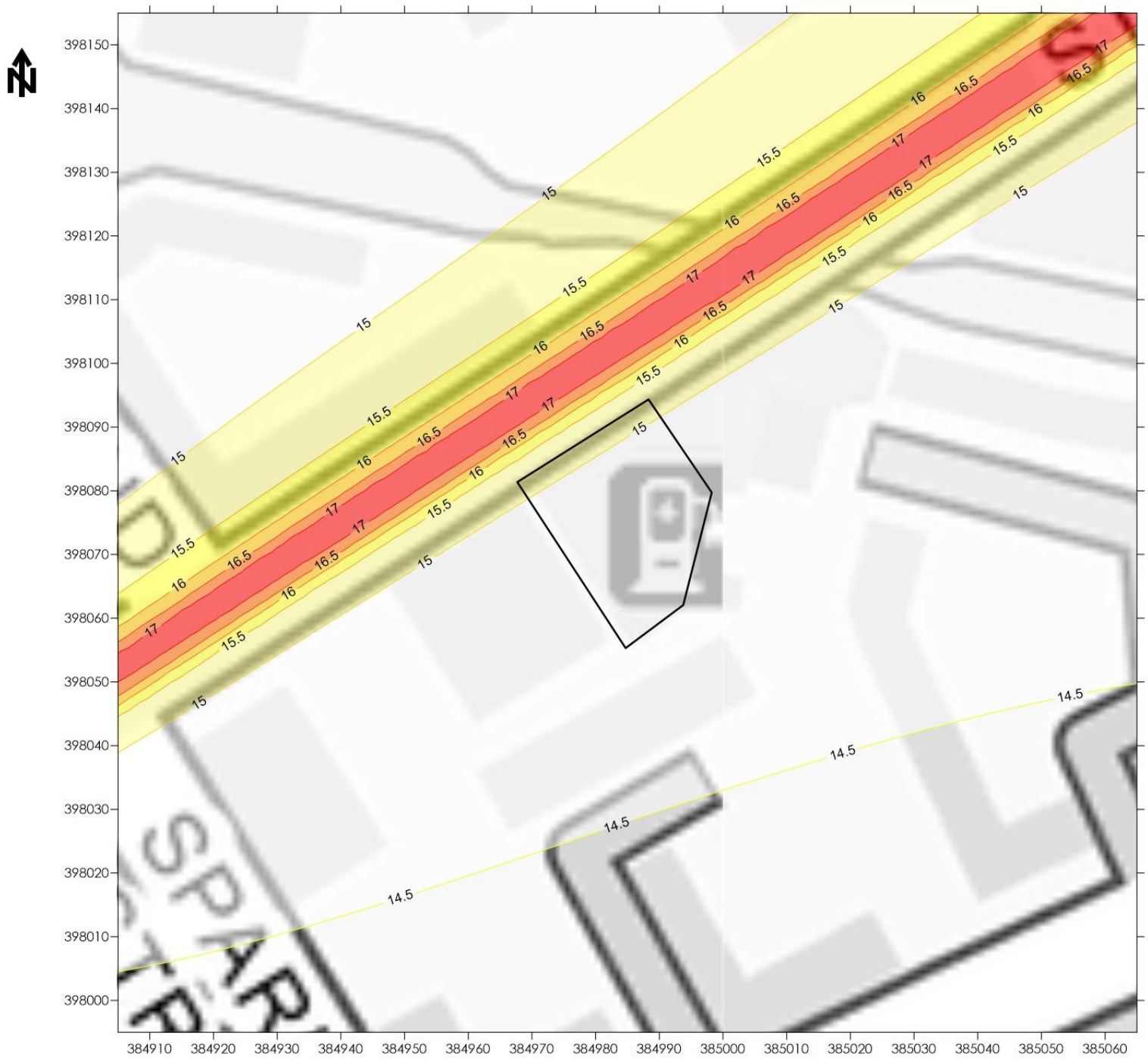
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Legend

Site Boundary

17
16.5
16
15.5
15
14.5

Annual Mean PM_{10} Concentrations (µg/m³)

Title

Figure 5 - Predicted Annual Mean PM_{10} Concentrations (µg/m³)

Project

Air Quality Assessment
Store Street, Manchester

Project Reference

9744

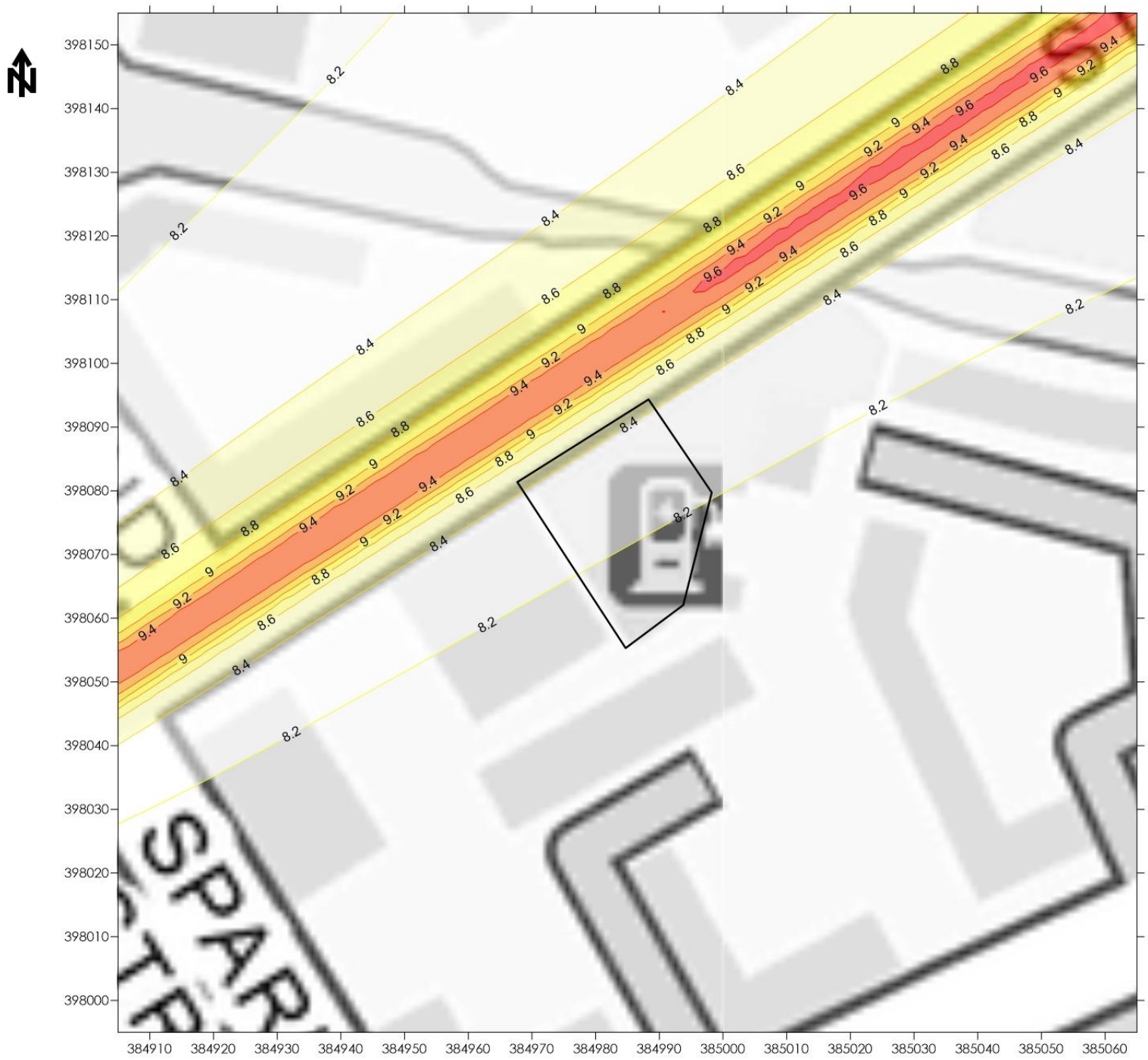
Client

Shaw Street Homes Developments Limited

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Legend

Site Boundary

Annual Mean $PM_{2.5}$ Concentrations (µg/m³)

9.6
9.4
9.2
9
8.8
8.6
8.4
8.2

Title

Figure 6 - Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m³)

Project

Air Quality Assessment
Store Street, Manchester

Project Reference

9744

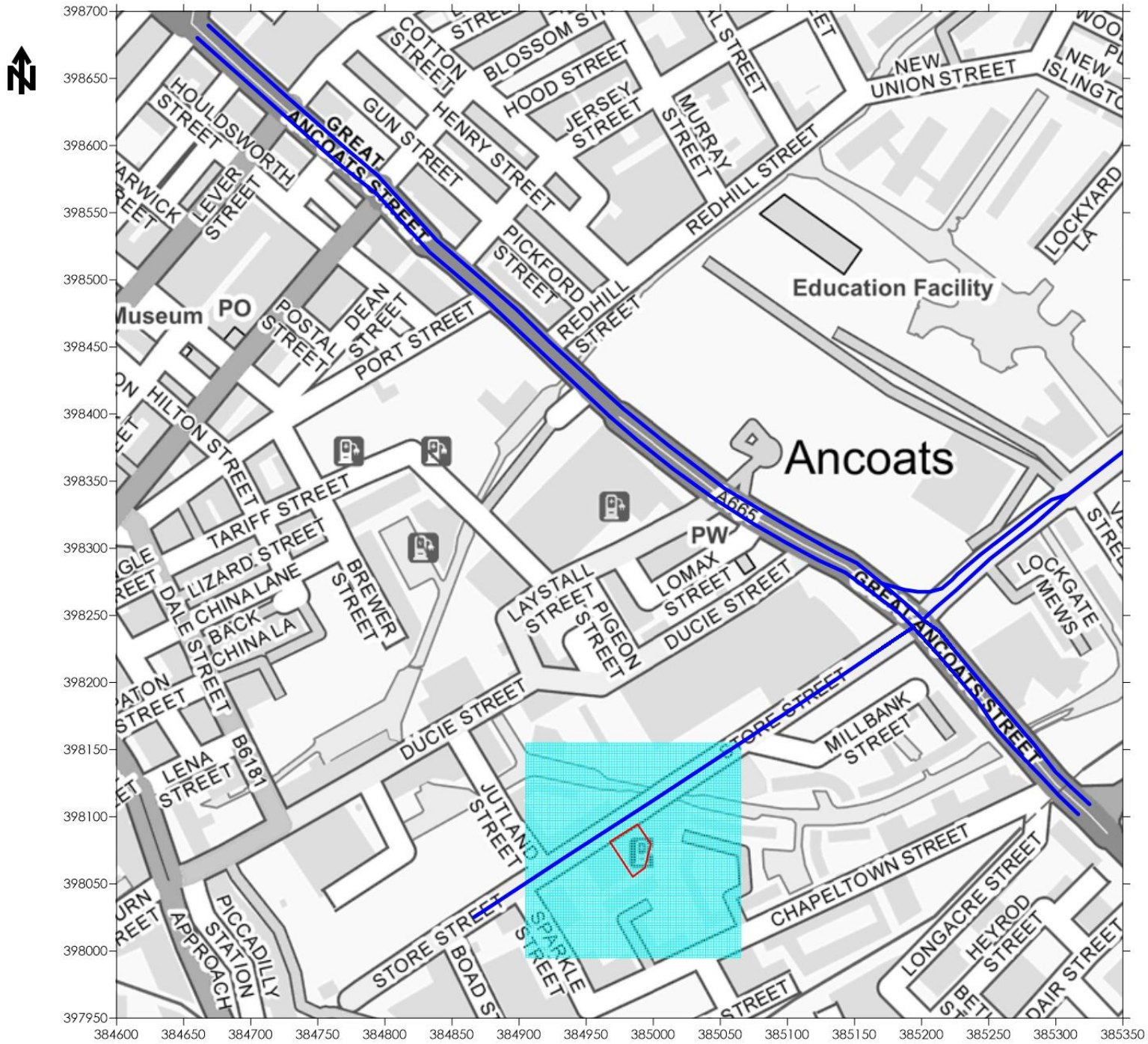
Client

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Legend

Site Boundary

Output Grid

Road Link

Title
Figure 7 - ADMS Roads Inputs

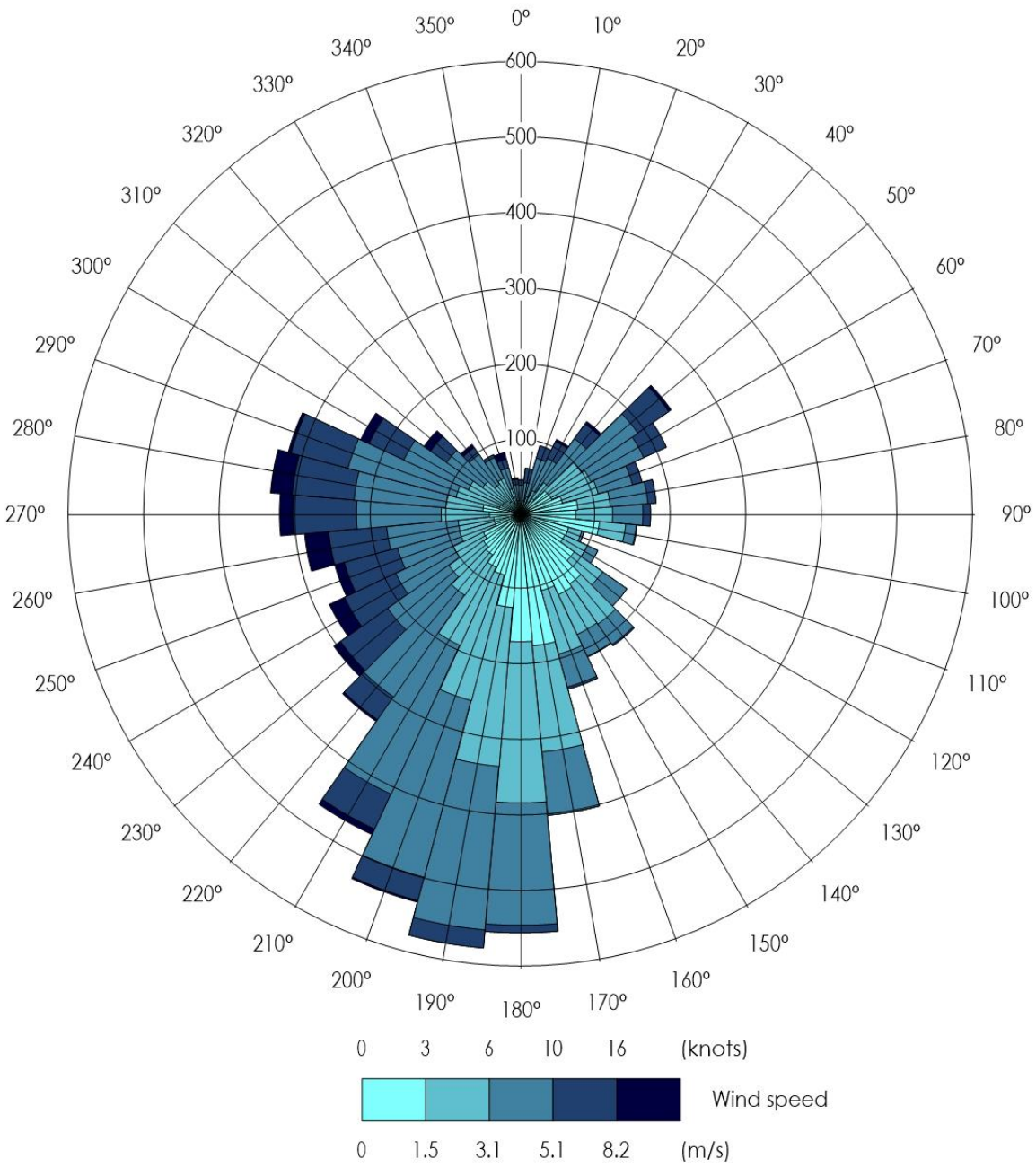
Project
Air Quality Assessment
Store Street, Manchester

Project Reference
9744

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Legend

Title
Figure 8 - Wind Rose of 2024
Manchester Airport
Meteorological Data

Project
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Store Stret, Manchester

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Appendix 1 - Assessment Input Data

Introduction

The proposals have the potential to expose future residents to elevated pollution levels. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site, dispersion modelling was undertaken in accordance with the following methodology.

Modelling was undertaken for 2024 to allow verification against recent monitoring results and 2027 to represent likely conditions in the opening year of the scheme.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.1.3). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

The following Sections detail the relevant inputs utilised in the assessment.

Assessment Area

The assessment area was defined based on the location of the development and roads likely to impact pollutant levels across the site. Ambient concentrations were predicted over NGR: 384905, 385065 to 397995, 398155. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

It should be noted that although the grid only covered the proposed site, source geometries were extended in order to ensure the impact of all relevant emissions in the vicinity of the scheme were considered.

Reference should be made to Figure 8 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Baseline traffic data for use in the assessment, including 24-hour AADT flows and fleet composition as HDV proportion, was obtained from the Department for Transport (DfT)[25]. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 2000 to 2024. It should be noted that the DfT web tool is referenced in DEFRA guidance[26] as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

Traffic data for Store Street was obtained from an Air Quality Assessment undertaken by Cass Allen for a proposed residential development off Sparkle Street (planning reference: 139986/FO/2024). The 2019 traffic data was converted to the 2024 base year and 2027 opening year utilising a factor obtained from TEMPro (version 8.0). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

Traffic data for Old Mill Road was obtained from an ES Chapter undertaken by Atkins Réalis for the proposed Manchester Digital Campus (planning reference: 141607/FO/2024). The 2030 DS traffic data was converted to the 2024 base year and 2027 opening year utilising a factor obtained from TEMPro (version 8.0).

Road parameters for input into the model were based on the following:

- Road widths were estimated from aerial photography and UK highway design standards;
- Vehicle speeds were estimated as an average for the relevant road link over the course of a 24-hour period;

25 https://roadtraffic.dft.gov.uk/#6/55.254/-11.107/basemap-regions-countpoints.

26 Local Air Quality Management (TG22) Technical Guidance, DEFRA, 2022.

- Vehicle speeds were determined following review of speed limits within the study extents, as well as congestion data available from GoogleMaps;
- Vehicle speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance27;
- Necessary adjustments to slow phase vehicle speeds were based upon congestion data available from GoogleMaps; and,
- The length for slow phases were derived using the approaching distance of 25m outlined in the DEFRA guidance[28], and adjusted accordingly based on aerial photography and congestion data available from GoogleMaps.

A summary of the traffic data used in the assessment is provided in Table A1.1.

Table A1.1 Traffic Data

Link		24-hour AADT Flow		HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2024	2027			
L1	Great Ancoats Street, east of Store Street, westbound	11,635	12,015	2.94	7.3	30
L2	Great Ancoats Street, east of Store Street, westbound, junction slow phase (SP)	11,635	12,015	2.94	9.7	15
L3	Great Ancoats Street, west of Store Street, westbound, junction SP	13,967	14,424	3.49	7.3	15
L4	Great Ancoats Street, west of Store Street, westbound	13,967	14,424	3.49	7.3	30
L5	Great Ancoats Street, west of Store Street, eastbound	10,488	10,831	3.78	7.3	30
L6	Great Ancoats Street, west of Store Street, eastbound, junction SP	10,488	10,831	3.78	9.7	15
L7	Great Ancoats Street, east of Store Street, eastbound, junction SP	14,260	14,726	2.38	7.3	15
L8	Great Ancoats Street, east of Store Street, eastbound	14,260	14,726	2.38	7.3	30
L9	Store Street, junction SP	5,793	5,982	1.90	10.3	15

27 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

28 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Link		24-hour AADT Flow		HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2024	2027			
L10	Store Street	5,793	5,982	1.90	7.3	30
L11	Great Ancoats Street, west of Redhill Street eastbound	10,488	10,831	3.78	7.3	30
L12	Great Ancoats Street, west of Redhill Street westbound	13,967	14,424	3.49	7.3	30
L13	Great Ancoats Street, west of Store Street, westbound SP	13,967	14,424	3.49	7.3	15
L14	Old Mill Street NB junction SP	2,608	2,694	2.80	4.2	15
L15	Old Mill Street NB	2,608	2,694	2.80	3.0	25
L16	Old Mill Street SB junction SP	2,608	2,694	2.80	6.3	15
L17	Old Mill Street	5,217	5,387	2.80	6.0	30
L18	Great Ancoats Street, west of Redhill Street eastbound Canyon	10,488	10,831	3.78	7.3	30
L19	Great Ancoats Street, west of Redhill Street westbound Canyon SP	13,967	14,424	3.49	7.3	15
L20	Great Ancoats Street, west of Redhill Street westbound	13,967	14,424	3.49	7.3	30

Reference should be made to Figure 7 for a graphical representation of the road link locations.

Canyons

Where buildings or walls surround roads, pollutant dispersion patterns are altered which can lead to high pollutant concentrations. These street canyons can significantly influence air quality along a road and therefore it is important to take consideration of their effects when undertaking dispersion modelling.

The release of ADMS-Roads version 4.0.1.0 in December 2015 incorporated a number of new features including an advanced street canyon module, which have been retained in version 5.1.0.2. Advanced street canyon modelling allows a number of parameters to be included in the dispersion model in order to predict pollutant dispersion patterns which better reflect air flow within complex urban geometries.

Canyons have five principal effects on dispersion which can influence pollutant concentrations. These are:

- Pollutants are channelled along street canyons;
- Pollutants are dispersed across street canyons by circulating flow at road height;
- Pollutants are trapped in recirculation regions;
- Pollutants leave the canyon through gaps between buildings as if there was no canyon; and,
- Pollutants leave the canyon from the canyon top.

The combined modelling of these effects will result in concentration patterns unique to each canyon. The parameters used in the assessment are outlined in Table A1.2.

Table A1.2 Canyon Parameters

Link	Parameter (m)					
	Canyon Width to Left	Average Height of Buildings to Left	Building Length Left	Canyon Width Right	Average Height of Buildings to Right	Building Length Right
L18	0	0	0	7.8	18	166
L19	7.8	20	94	0	0	0

A choice of two modes is provided for use in the advanced canyon module. Standard mode assumes that each road is part of a continuous network of roads with similar properties. Network mode analyses the road network to determine transport of pollutants between adjoining street canyons, allows for varying concentrations along the canyon and accounts for transport of pollutants out of the end of a canyon. Network mode is considered most accurate for detailed local and as such was selected for use I the model.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicle emission factors and fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2024 emission factors were utilised in preference to the development opening year in order to provide robust concentration predictions. As predictions for 2024 were verified, it is considered the assessment is conservative.

Meteorological Data

Meteorological data used in the assessment was taken from Manchester Airport meteorological station over the period 1st January 2024 to 31st December 2024 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 14.2km south-west of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 8 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1m was used to describe the modelling extents. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'cities, woodlands'.

A z_0 of 0.2m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents and meteorological data. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

Annual mean NO_2, PM_{10} and $PM_{2.5}$ background concentrations for use in the assessment were taken from the DEFRA mapping grid square containing the site, as shown in Table 10.

Background concentrations from 2024 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance[29].

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

[29] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of the assessment, model verification was undertaken for 2024 using traffic data, meteorological data and monitoring results from this year.

Monitoring of NO_2 concentrations was undertaken at three locations within the vicinity of the roads included in the dispersion model during 2024. It should be noted that monitoring location CAP_MANC_013 was not used due to its location, less than 1m from the roadside. In line with DEFRA guidance[30], 'kerbside' monitoring locations are not suitable for model verification.
The results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance[31]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table A1.3.

Table A1.3 NO_x Verification - Monitoring Result

Monitoring Location		Monitored NO_2 Concentration (µg/m³)	Calculated Road NO_x Concentration (µg/m³)
MAN71NO	Great Ancoats Street	29.00	16.16
CAP_MANC_012	A665 (Great Ancoats Street)	38.50	42.64
CAP_MANC_014	A665 (Great Ancoats Street)	39.20	44.80

The annual mean road NO_x concentrations predicted from the dispersion model and the 2024 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.4.

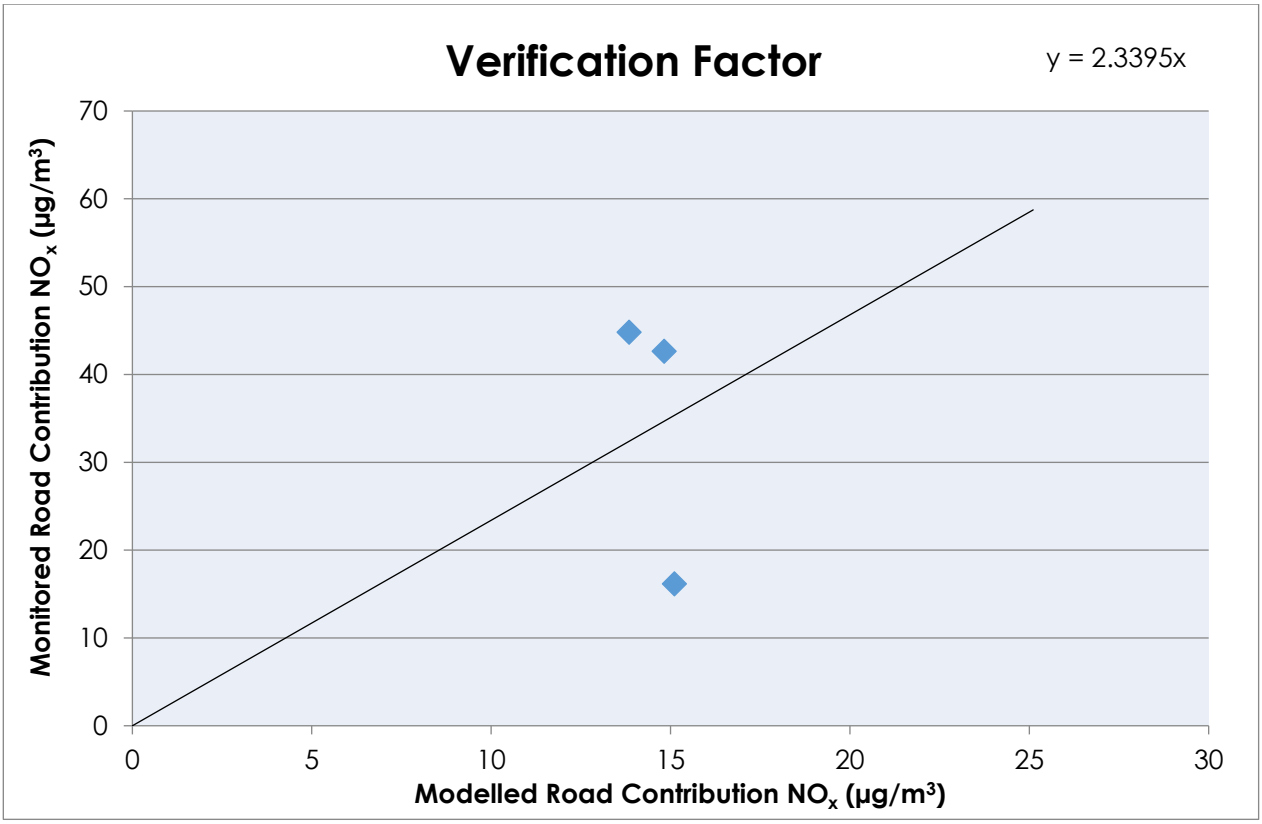
Table A1.4 NO_x Verification - Modelling Result

Monitoring Location		Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
MAN71NO	Great Ancoats Street	16.16	15.11
CAP_MANC_012	A665 (Great Ancoats Street)	42.64	14.82
CAP_MANC_014	A665 (Great Ancoats Street)	44.80	13.85

30 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

31 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

The monitored and modelled road NOx concentrations were graphed and the equation of the trendline based on linear progression though zero calculated. This indicated that a verification factor of 2.339 was required to be applied to all road NOx modelling results, as shown in Graph 1.



Monitoring of PM_{10} or $PM_{2.5}$ concentrations was not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA guidance[32].

[32] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vitae

CLAIRE MEDDINGS

Director

MSc, BSc (Hons), CSci, MIAQM, MIEnvSc

Tel: 0161 706 0075 | Email: Claire.Meddings@red-env.co.uk

KEY EXPERIENCE:

Claire is a Director with specialist experience in the air quality sector

Her key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide range of clients from the residential, retail, commercial, leisure and industrial and infrastructure sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-6 and AERMOD. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Assessment of fugitive dust impacts from a range of waste and industrial developments.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Undertaken and overseeing pollutant monitoring campaigns.
- Provision of expert advice and attendance at DCO examination process.

SELECT PROJECTS SUMMARY:

Residential and Educational

Air Quality Assessments for a large number of proposed residential and educational developments across the UK. The assessments included consideration of construction phase dust emissions and mitigation was recommended to minimise fugitive dust emissions accordingly. The suitability of the sites for the proposed residential and educational uses was also assessed. The assessment utilised a range of assessment tools including relevant screening criteria, air dispersion modelling using ADMS-Roads, local air quality monitoring and Defra published assessment tools. Where required for sites in London, Air Quality Neutral assessments were also undertaken utilised the Greater London Authority guidance.

Air Quality Monitoring

Air Quality Assessments and overseeing air quality monitoring campaigns for a number of sites within Birmingham. Air dispersion modelling was undertaken and air quality monitoring utilising NO_2 diffusion tubes was carried out for use in verification of the dispersion model. Mitigation was recommended where appropriate to reduced the exposure of future uses of the sites to elevated pollutant concentrations.

Odour Assessments

Undertaken to support developments in the UK, including consideration of the impact of existing odour sources on proposed developments or to assess proposed odour releases. A combination of field odour surveys, risk assessments and detailed dispersion modelling were undertaken, with mitigation measures recommended where required.

Commercial and Retail

Foodstores across the UK - Air quality assessments for a number of proposed foodstores across the UK. Consideration was given to construction phase dust emissions and vehicle emissions generated by the foodstore operations. Relevant screening criteria and detailed air dispersion modelling were utilised in the assessment. Mitigation was recommended as required to minimise construction phase dust emissions.

Commercial development, Worksop - Air quality assessment and input into the EIA for a proposed large scale commercial development near Worksop. Assessments of construction phase dust and operational phase road traffic emissions were undertaken and consideration was given to both human and ecological receptors.

Industrial and Infrastructure

Greater Manchester Waste PFI Contract - Air Quality and Odour Assessments were undertaken as part of the Planning Applications and Environmental Permit applications for a number of proposed waste facilities in Greater Manchester.

Energy from Waste Development, Scotland - Air Quality Assessment and coordination of the EIA and Environmental Permit Application for a proposed Energy from Waste development in Scotland. Considered industrial emissions from flue stacks as well as additional road traffic movements generated by the development

Strategic Rail Freight Interchange, Hinckley - oversaw the Air Quality Assessment for the proposed Rail Freight Interchange and acted as expert witness as part of the Development Consent Order (DCO) examination process.

LAUREN MASSINGHAM

Associate Air Quality Consultant

BSc (Hons), CEnv, MIAQM, MIEnvSc

Tel: 0161 706 0075 | Email: lauren.massingham@red-env.co.uk

KEY EXPERIENCE:

Lauren is an Associate with specialist experience in the air quality sector. Her key capabilities include:

- Undertaking and managing a variety of air quality projects in a range of sectors including residential, student accommodation, educational, commercial and industrial projects
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-6. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Co-ordination and management of multi-disciplinary projects and submissions.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Active STEM Ambassador role, working with local schools to educate about air quality.

SELECT PROJECTS SUMMARY:

Norton Lodge, Malton

An ES Chapter and technical appendix were supplied to support this EIA development. The development comprised a new link road and therefore required multiple assessment scenarios. The Chapter also looked at impacts at ecological designations, impacts with an AQMA, odour from neighbouring facilities and impacts on proposed receptors. The AQMA in Malton was a particular concern for the council. The overall impact was considered to be not significant.

Yorkshire Post Phase 2, Leeds

An Air Quality Assessments to support each of the three proposed towers which form part of the Yorkshire Post Phase 2. These high-rise buildings were proposed for student accommodation and commercial uses. In addition to following LAQM.TG(22) and EPUK&IAQM guidance, the West Yorkshire Low Emissions Strategy (WYLES) Air Quality & Emissions Technical Planning Guidance was followed. Due to the 'Major' development classification in line with the WYLES guidance, damage costs for each tower were calculated. Mitigation measures were suggested. The energy strategy for the development was for a connection to the Leeds PIPES local heating district network.. The scheme was approved.

Old Hall Street, Liverpool

An Air Quality Assessment to support a student accommodation development. The scheme is 'car free' and trips generated dispersed to below the threshold once off Old Hall Street. The Site was considered suitable for residential use.

Viadux Phase 2, Manchester

Environmental Impact Assessment to support a high-rise residential led scheme in the city centre. The assessment included both operational and construction phase impacts. Impacts with both phases were considered to be 'not significant'. Additionally, in line with Manchester City Council Air Quality Guidance a Damage Cost calculation was included to ensure that sufficient mitigation was included to reduce air quality impacts as much as possible.

Plot 9b, First Street, Manchester

An ES Chapter to support the EIA development on land off First Street. The assessment included operational and construction phase impacts, in addition to modelling to ensure site suitability. Additionally, in line with Manchester City Council Air Quality Guidance a Damage Cost calculation was included to ensure that sufficient mitigation was included to reduce air quality impacts as much as possible. This included improving footpaths so that the site linked to other Plots within the wider First Street development. The Chapter concluded that impacts were considered not significant.

Winwick Road, Warrington

Air Quality Assessment for the proposed B2/B8 development in Warrington. Changes in pollution levels were considered at sensitive receptors as a result of trips generated and their distribution across the local area. Results of the dispersion modelling study indicated air quality impacts as a result of the scheme were not significant.