Redmore environmental

Air Quality Assessment

Kingsway, Burnage

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Prepared by	Natasha Jones	Natasha Jones		
Position	Graduate Air Quality Consultant	Graduate Air Quality Consultant		
Reviewed by	Olivia Davidson	Olivia Davidson		
Position	Air Quality Consultant	Air Quality Consultant		
Authorised by	Jethro Redmore	Jethro Redmore		
Position	Director	Director		
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Serendipity Labs, Building 7 Exchange Quay, Salford, M5 3EP

info@red-env.co.uk | 0161 706 0075 | www.red-env.co.uk

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Executive Summary

Redmore Environmental Ltd was commissioned by Triple Jersey Limited to undertake an Air Quality Assessment in support of a planning application for a residential development on land off Kingsway, Burnage.

The development may lead to the exposure of future residents to any existing air quality issues at the site, as well as adverse air quality impacts at sensitive locations during the construction and operational phases. 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 impacts associated with the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. It is considered that the use of good practice 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 the exposure of future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken 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 at the building façades. As such, the site is considered suitable for the proposed end use from an air quality perspective.

Throughout the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed using standard screening criteria. Due to the decrease in predicted vehicle trips associated with the proposals when compared with the existing site use, road traffic exhaust emission impacts were not predicted to be significant.

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 Background

1.1.1 Redmore Environmental Ltd was commissioned by Triple Jersey Limited to undertake an Air Quality Assessment in support of a planning application for a residential development on land off Kingsway, Burnage.

1.1.2 The development may lead to the exposure of future residents to any existing air quality issues at the site, as well as adverse air quality impacts at sensitive locations during the construction and operational phases. 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 impacts associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land off Kingsway, Burnage, at approximate National Grid Reference (NGR): 386309, 393124. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the demolition of the existing retail store and the subsequent construction of 115 dwellings and associated infrastructure.

1.2.3 An Air Quality Management Area (AQMA) has been declared by Manchester City Council (MCC) due to exceedences of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO_2). The development is partially located within the AQMA. As such, there is the potential for vehicles travelling to and from the development to increase pollution levels in this sensitive area and for the exposure of future residents to poor air quality. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions and consider potential effects as a result of the proposals. 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:

- 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 were also 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 and Interim Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Interim Target

Pollutant	Air Quality Objective/Interim 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

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

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
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

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

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
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 Local Authorities (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 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 2023 and 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 achievement 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, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]."

[4] NPPF, Ministry of Housing, Communities and Local Government, 2023.

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 on 6th March 2014 and updated on 1st November 2019 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 considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

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

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

2.6 Local Planning Policy

2.6.1 The Manchester Local Plan consists of a series of planning documents of which the Core Strategy Development Plan Document (DPD)[6] is central. This was adopted by MCC on 11th July 2012 and provides policies which guide the determination of planning applications within the city.

2.6.2 Review of the Core Strategy DPD[7] 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

6 Core Strategy DPD, MCC, 2012.

7 Core Strategy DPD, MCC, 2012.

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

[…]

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."

2.6.3 The 'Places for Everyone Joint Development Plan Document'[8] was adopted by the Greater Manchester Combined Authority (GMCA) on 21st March 2024. Review of the document indicated the following policy of relevance to this assessment:

"Policy JP-S5: Clean Air

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

1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution; 2. Determining planning applications having regard to the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;
3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air quality can be fully assessed and development only permitted where they are acceptable and/or suitable mitigation can be provided;

8 Places for Everyone Joint Development Plan Document, GMCA, 2024.

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

2.6.4 MCC has also produced an 'Air Quality & Planning Technical Guidance' Supplementary Planning Document (SPD)[9] which provides guidance on assessing the impact of proposed development on air quality.

2.6.5 The above policies and SPD were taken into consideration throughout the undertaking of the assessment.

[9] Air Quality & Planning Technical Guidance SPD, MCC, 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 issues have been assessed in accordance with the following methodology, which was agreed with Lisa Jones, Environmental Protection Officer at MCC, on 29th November 2023.

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 four types to reflect their different potential impacts. These are:

- Demolition
- 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

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

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	Demolition	• Total volume of building to be demolished greater than 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 12m above ground level

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

Magnitude	Activity	Criteria
	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

3.2.14 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area

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, shopping streets, playing fields, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.15 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

3.2.16 These factors were considered in the undertaking of this assessment.

3.2.17 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
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.18 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/m³	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m³	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m³	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m³	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32µg/m³	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m³	More than 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	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

3.2.19 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

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

3.2.21 Table 8 outlines the risk category from demolition activities.

Table 8 Construction Dust - Dust Risk Category from Demolition Activities

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

3.2.22 Table 9 outlines the risk category from earthworks, construction and trackout activities.

Table 9 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

3.2.23 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

3.2.24 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**.

3.2.25 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The IAQM guidance[12] suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

Potential Future Exposure

3.3.1 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.

3.3.2 The dispersion modelling results were compared against the relevant AQOs and Interim Target in order to determine the potential for exposure of future residents to elevated pollutant concentrations and identify any requirement for mitigation.

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

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

Potential Development Impacts

3.3.3 The development has the potential to increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. An assessment was therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[13] guidance to determine the potential for trips generated by the development to affect local air quality.

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

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,
- Introduction of a new junction or removal of an existing junction near to relevant receptors.

3.3.5 Should these criteria not be met, then the IAQM guidance[14] considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

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

[14] 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 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 their area of jurisdiction. This process has indicated that annual mean NO_2 concentrations 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 GMCA AQMA located within the Manchester City Council area."

4.2.2 The development is partially 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 and the exposure of future residents to poor air quality. 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 concentrations is undertaken by MCC and the neighbouring Stockport Metropolitan Borough Council (SMBC) throughout their areas of jurisdiction. Recent NO_2 results recorded in the vicinity of the development are shown in Table 10. Exceedences of the relevant AQO are shown in **bold**.

Table 10 Monitoring Results

Monitoring Site	Monitored Annual Mean NO_2 Concentration (µg/m³)			
	2019	2020	2021	2022
MA74NO	33.6	23.3	25.6	25.4
MA75NO	**47.0**	33.7	39.0	38.8
MA80NO	33.2	22.5	25.7	25.7
MA81NO	23.1	16.6	18.1	18.8
ST27NO	17.5	12.6	13.1	13.1

4.3.2 As shown in Table 10, annual mean NO2 concentrations were above the relevant AQO at MA75NO during 2019. As this monitor is a kerbside position within an AQMA, elevated pollution levels are to be expected. Annual mean NO_2 concentrations were below the AQO of 40µg/m³ at all other monitoring locations within the vicinity of the site in recent years. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 Pollutant concentrations recorded during 2020 and 2021 were lower than 2019 due to a reduction in traffic and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution.

4.3.4 MCC and SMBC do not undertake monitoring of PM_{10} or $PM_{2.5}$ within the vicinity of the proposed development.

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: 386500, 393500. Data for this location was downloaded from the DEFRA website[15] for the purpose of the assessment and is summarised in Table 11.

[15] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

Table 11 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2019	2024	2025
NO_2	17.87	14.74	14.25
PM_{10}	12.96	12.23	12.13
$PM_{2.5}$	8.92	8.43	8.36

4.4.2 As shown in Table 11, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs and Interim Target at the 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. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase Sensitive Receptors

4.5.2 Receptors sensitive to potential dust impacts during demolition, 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 12.

Table 12 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	0
Up to 50	More than 100	0
Up to 100	More than 100	-
Up to 250	More than 100	-

4.5.3 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 13.

Table 13 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	0
Up to 50	More than 100	0

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

4.5.5 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 14.

Table 14 Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The baseline study did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	The baseline study did not indicate any dust generating activities likely to cause cumulative impacts
Pre-existing screening between the source and the receptors	Trees and vegetation are located along the east of the site boundary and sporadically along the north and west boundaries of the proposed site. These may act as a barrier between emission sources and receptors should they be retained during construction
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the south. As such, receptors to the north are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is likely that it will extend over one year. The sensitivity of nearby receptors is unlikely to change during this time
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.6 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 schools and residential properties.

4.5.7 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 15.

Table 15 Sensitivity of the Surrounding Area to Potential Dust Impacts

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

5.0 ASSESSMENT

5.1 Introduction

5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposed development, as well as the exposure of future residents to poor air quality. These issues are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

5.2.1 The undertaking of activities such as demolition, 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 on the local road network also have the potential to result in the re-suspension of dust from 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.

Step 2

Demolition

5.2.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of the existing building on site. It is estimated that the building volume to be demolished is between 12,000m^3 and 75,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **medium**.

5.2.5 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 8, the site is considered to be **medium** risk for dust soiling as a result of demolition activities.

5.2.6 Table 15 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outline in Table 8, the site is considered to be **low** risk for human health impacts as a result of demolition activities.

Earthworks

5.2.7 Earthworks may involve excavating material, haulage, tipping and stockpiling as well as site levelling and landscaping. The area of the proposed development 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**.

5.2.8 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of earthworks.

5.2.9 Table 15 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of earthworks.

Construction

5.2.10 Due to the size of the development, the total building volume will be more than 75,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

5.2.11 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **high** risk site for dust soiling as a result of construction activities.

5.2.12 Table 15 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health impacts as a result of construction activities.

Trackout

5.2.13 Based on the site area, it is anticipated that the unpaved road length may be more than 100m during certain stages of construction. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **large**.

5.2.14 Table 15 indicates the sensitivity of the area to dust soiling effects to people and property is **high**. In accordance with the criteria outlined in Table 9**Error! Reference source not found.**, the development is considered to be a **high** risk site for dust soiling as a result of trackout activities.

5.2.15 Table 15 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.16 A summary of the risk from each dust generating activity is provided in Table 16.

Table 16 Summary of Potential Unmitigated Dust Risks

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

5.2.17 As indicated in Table 16, the potential risk of dust soiling is **high** from construction and trackout, **medium** from demolition and **low** from earthworks. The potential risk of human health effects is **medium** from trackout, **low** from demolition and construction and **negligible** from earthworks.

5.2.18 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.

Step 3

5.2.19 The IAQM guidance[16] 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 17. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

Table 17 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 (DMP) or similar, 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 off- site, and the action taken to resolve the situation in the log book
Monitoring	• Undertake daily on-site and off-site inspection to monitor dust, record inspection results, and make the log available to the LA when asked • Carry out regular site inspections to monitor compliance with the DMP, 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

16 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 boundary that are at least as high as any stockpiles on site • Fully enclose 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 15mph on surfaced and 10mph on unsurfaced haul roads and work areas
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	• No bonfires and burning of waste materials
Demolition	• Soft strip inside buildings before demolition, retaining walls and windows in the rest of the building where possible, to provide a screen against dust • Ensure effective water suppression is used during demolition operations • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable • Only remove the cover in small areas during work and not all at once

Issue	Control Measure
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 stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery • For smaller supplies of fine powder materials ensure bas area sealed after use and stored appropriately to prevent dust
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 • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever the size and layout permits • Access gates to be located at least 10m from receptors where possible

Step 4

5.2.20 Assuming the relevant mitigation measures outlined in Table 17 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance[17].

5.3 Operational Phase Assessment

Potential Future Exposure

5.3.1 The proposed development has the potential to expose future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Reference should be made to Figures 5, 6 and 7 for graphical representations of predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations.

5.3.2 As shown in Figure 5, annual mean NO_2 concentrations were predicted to be below the AQO of 40µg/m^3 at all building façades. The maximum level was 35.01µg/m^3.

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

5.3.3 As shown in Figure 6, annual mean PM_{10} concentrations were predicted to be below the AQO of 40µg/m^3 at all building façades. The maximum level was 15.55µg/m^3.

5.3.4 As shown in Figure 7, annual mean $PM_{2.5}$ concentrations were predicted to be below the Interim Target of 12µg/m^3 at all building façades. The maximum level was 10.38µg/m^3.

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

Potential Development Impacts

5.3.6 Any vehicle movements associated with the development will generate exhaust emissions on the local and regional road networks. Information provided by Andrew Moseley Associates, the Transport Consultants for the project, indicated the existing retail store is predicted to generate 2,692 vehicle trips per day. The proposals are predicted to generate 531 vehicle trips per day. As such, there predicted to be a net decrease of 2,161 daily vehicle trips from the site as a result of the development.

5.3.7 As shown above, the proposals are not predicted to result in an increase of LDV flows of more than 100 AADT in an AQMA or 500 AADT elsewhere, include significant highway realignment or the introduction of a junction and there will not be requirement for more than 25 HDV movements per day. Potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM[18] screening criteria shown in Section 3.3.

5.4 Mitigation

5.4.1 As air quality impacts associated with the proposals were predicted to be **not significant**, further mitigation to control effects is not considered necessary. However, a number of mitigation measures have been included within the development in accordance with the requirements of the IAQM document 'Land-Use Planning & Development Control Planning for Air Quality'[19] to encourage the use of sustainable transport modes, manage

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

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

vehicle flow and reduce pollution around the site. Table 18 describes the good practice principles detailed in the IAQM guidance[20] along with how each has been addressed with regards to the proposals.

Table 18 Good Practice Design Principles

Phase	Principle	Action
Design Phase	New developments should not contravene the Council's Air Quality Action Plan[21], or render any of the measures unworkable	It is confirmed that the proposed development will not contravene MCC's Air Quality Action Plan, 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 not create a new street canyon
	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 close proximity to local public transport facilities and amenities
	New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads, or directing combustion generated pollutants through or chimney stacks	As shown previously, exposure of future occupants to exceedences of the relevant AQOs or Interim Target is not anticipated
Operational Phase	The provision of at least 1 Electric Vehicle (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 points will be included if required by MCC
	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	A Travel Plan can be produced for the development if requested by MCC

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

21 Greater Manchester Air Quality Action Plan (GMAQAP) 2016-2021, GMCA, 2016.

Phase	Principle	Action
	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	Any boilers to be included in the development will be provisioned in accordance with the relevant requirements

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

6.0 CONCLUSION

6.1.1 Redmore Environmental Ltd was commissioned by Triple Jersey Limited to undertake an Air Quality Assessment in support of a planning application for a residential development on land off Kingsway, Burnage.

6.1.2 The development may lead to the exposure of future residents to any existing air quality issues at the site, as well as adverse air quality impacts at sensitive locations during the construction and operational phases. 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 impacts associated with the scheme.

6.1.3 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. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **not significant**.

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

6.1.5 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 Interim Target at all building facades. As such, the site is considered suitable for the proposed end use from an air quality perspective and mitigation is not required.

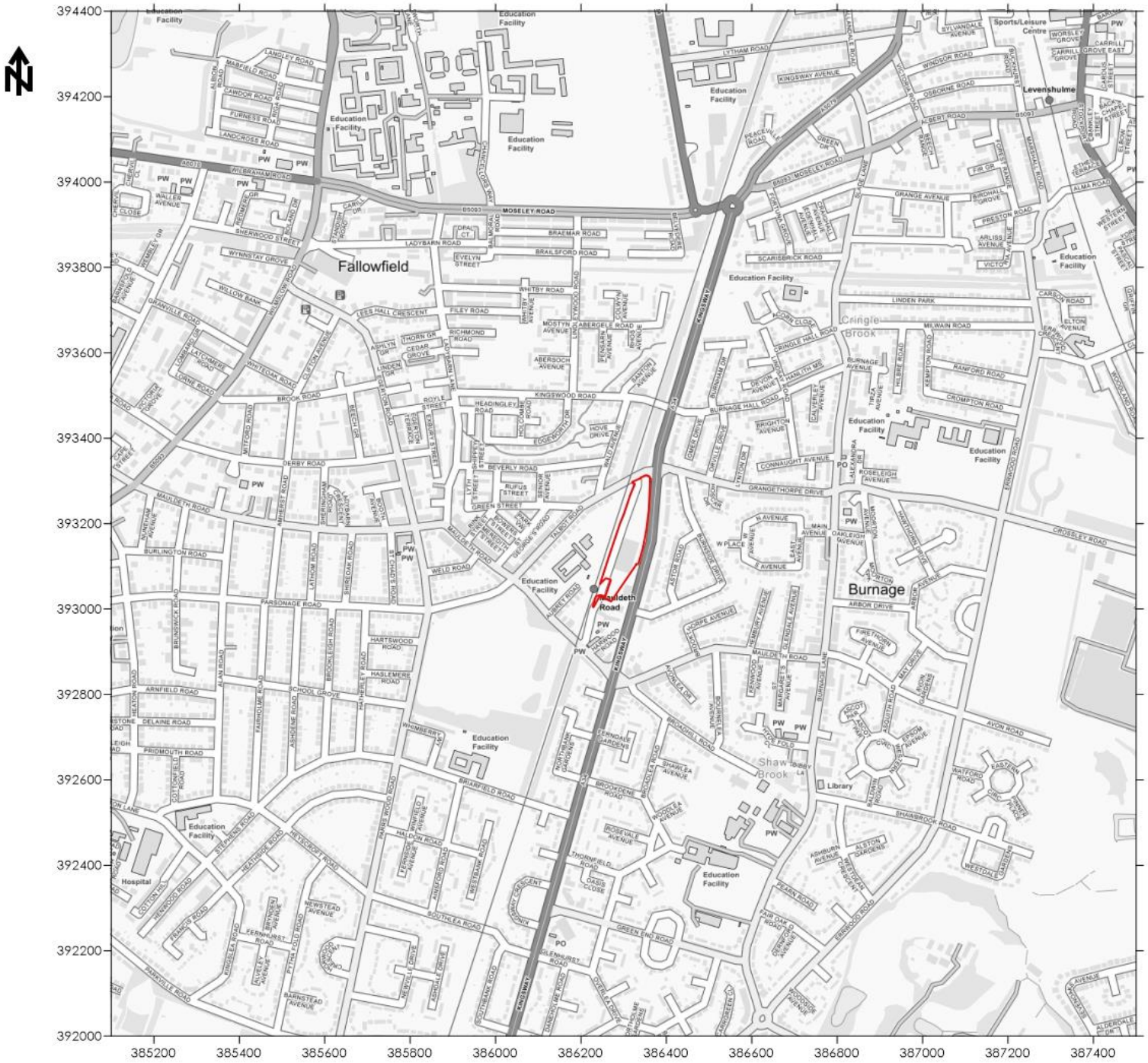
6.1.6 Throughout the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed using standard screening criteria. Due to the decrease in predicted vehicle trips associated with the proposals when compared to the existing site use, road traffic exhaust emission impacts were predicted to be **not significant**.

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

7.0 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
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DPD	Development Plan Document
EB	Eastbound
GMCA	Greater Manchester Combined Authority
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
MCC	Manchester City Council
NB	Northbound
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
z_0	Roughness length
SB	Southbound
SMBC	Stockport Metropolitan Borough Council
SP	Slow Phase
WB	Westbound

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location Plan

Project
Air Quality Assessment
Kingsway, Burnage

Project Reference
6593

Client
Triple Jersey Limited

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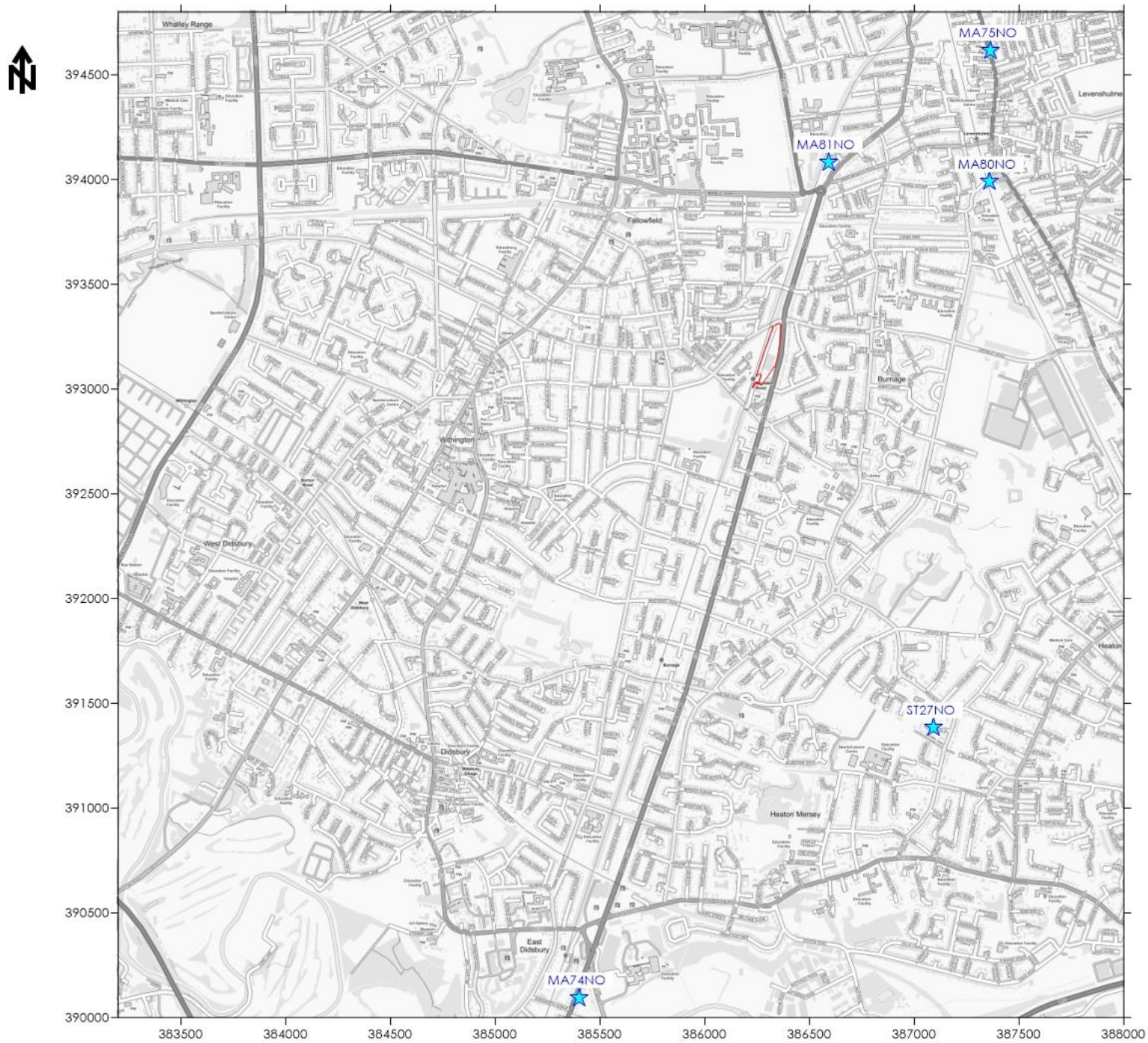

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Site Boundary

Monitor

Title
Figure 2 - Monitoring Locations

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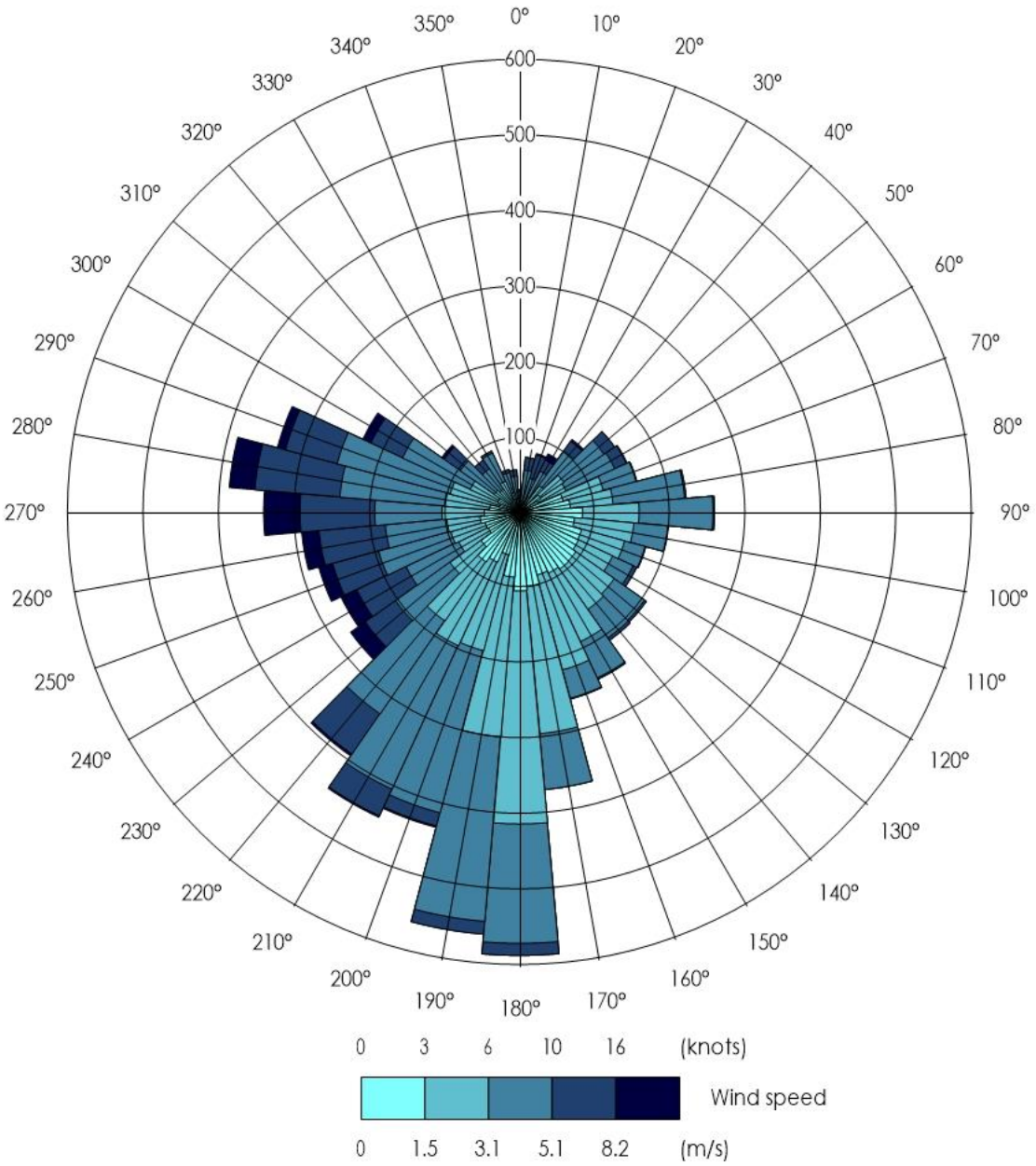

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Title
Figure 3 - Wind Rose of 2019
Manchester Airport
Meterological Data

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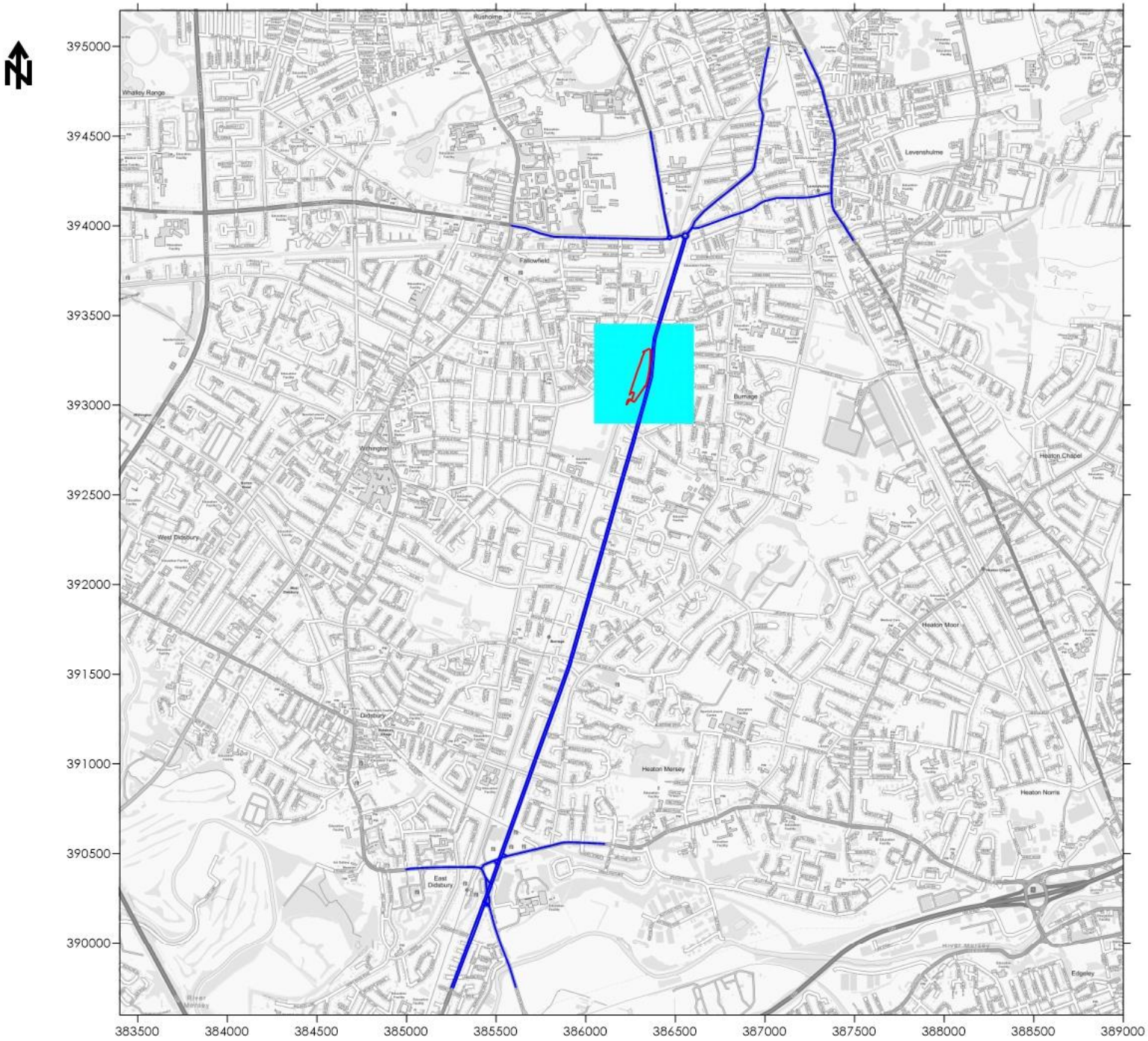

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Site Boundary

Output Grid

Road Link

Title
Figure 4 - ADMS-Roads Inputs

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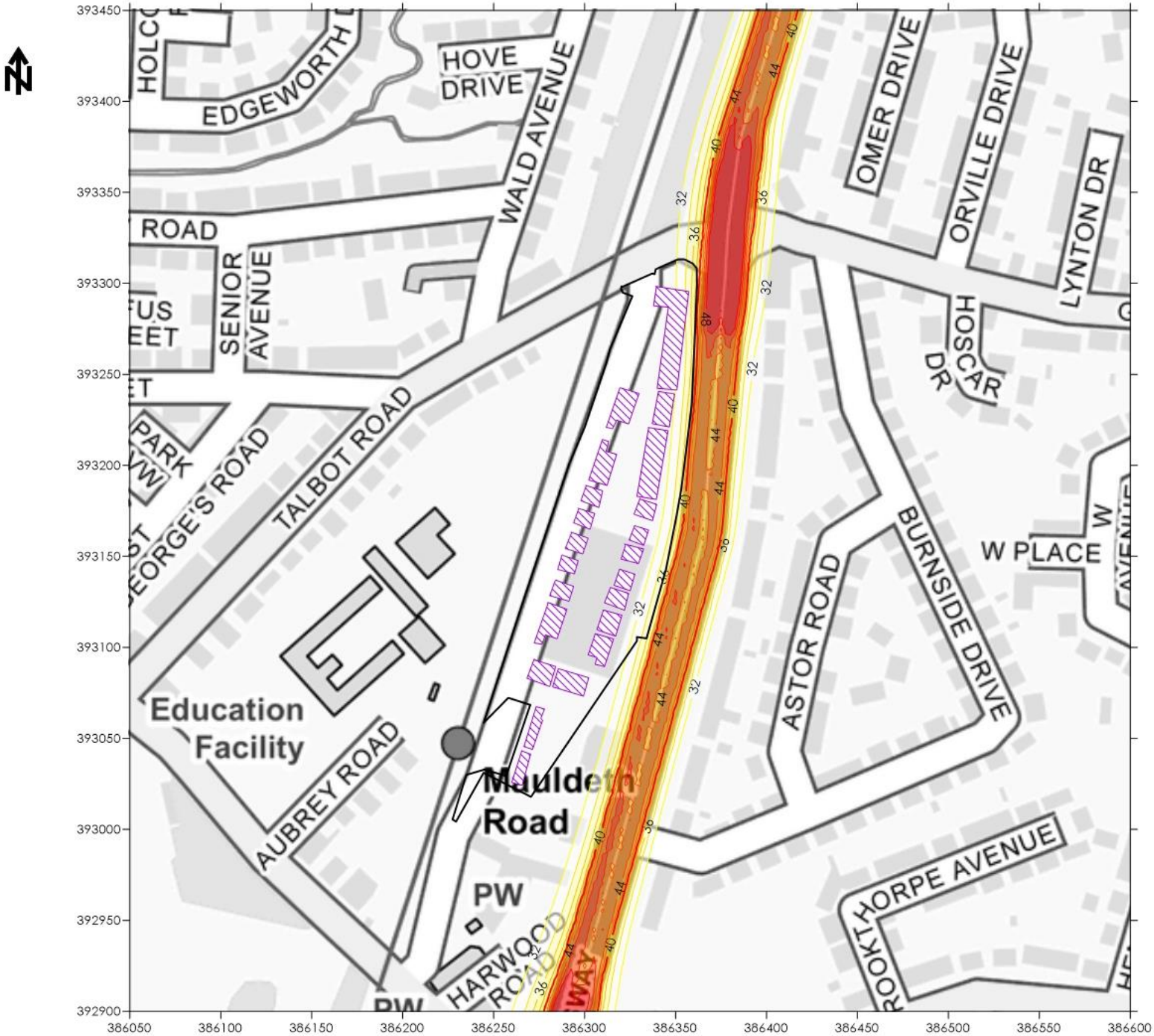

Legend

Site Boundary

Proposed Development

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

48
46
44
42
40
38
36
34
32

Title
Figure 5 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)

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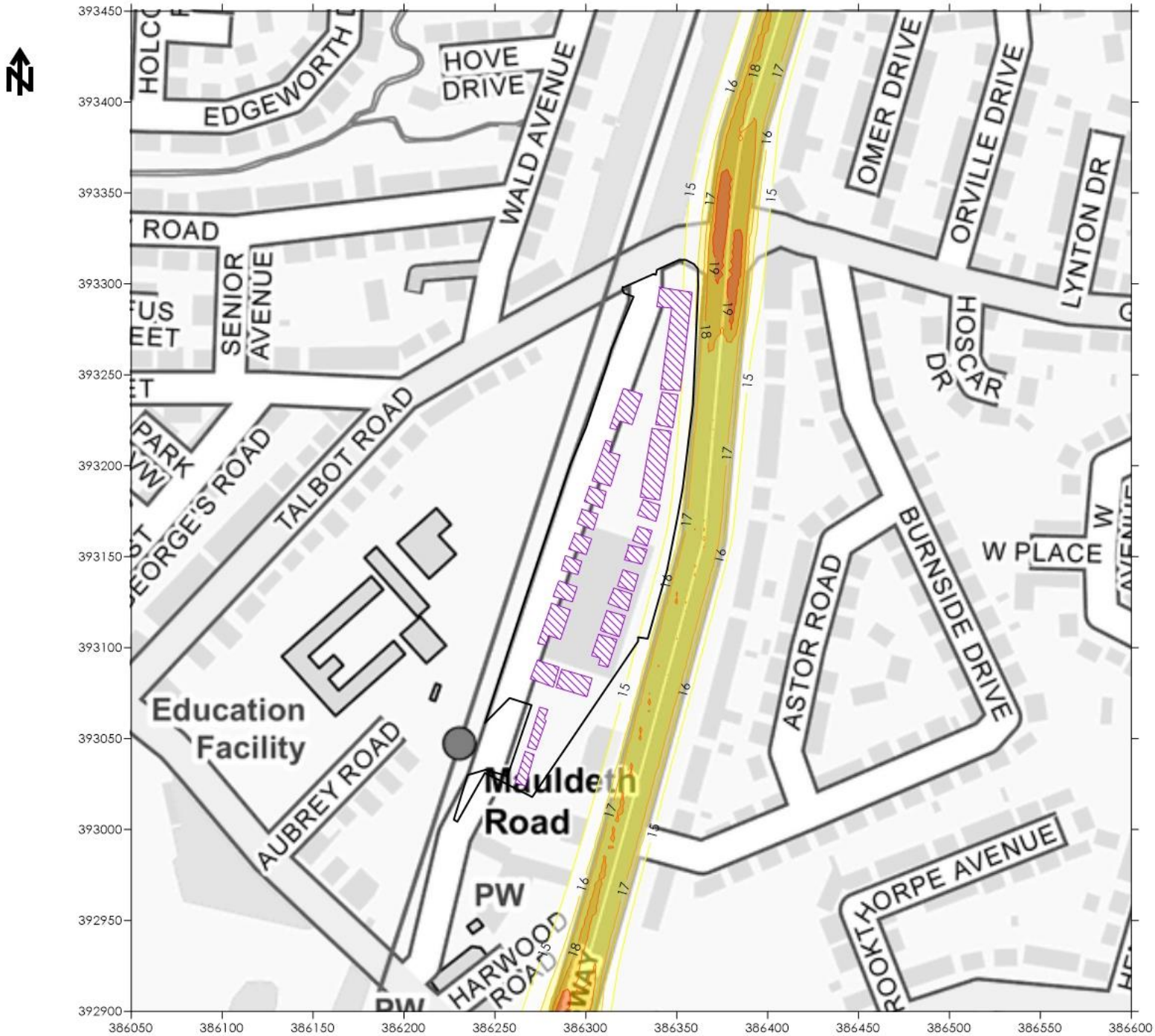

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Site Boundary

Proposed Development

Annual Mean PM_{10} Concentration ($\mu g/m^3$)

20
19
18
17
16
15

Title
Figure 6 - Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

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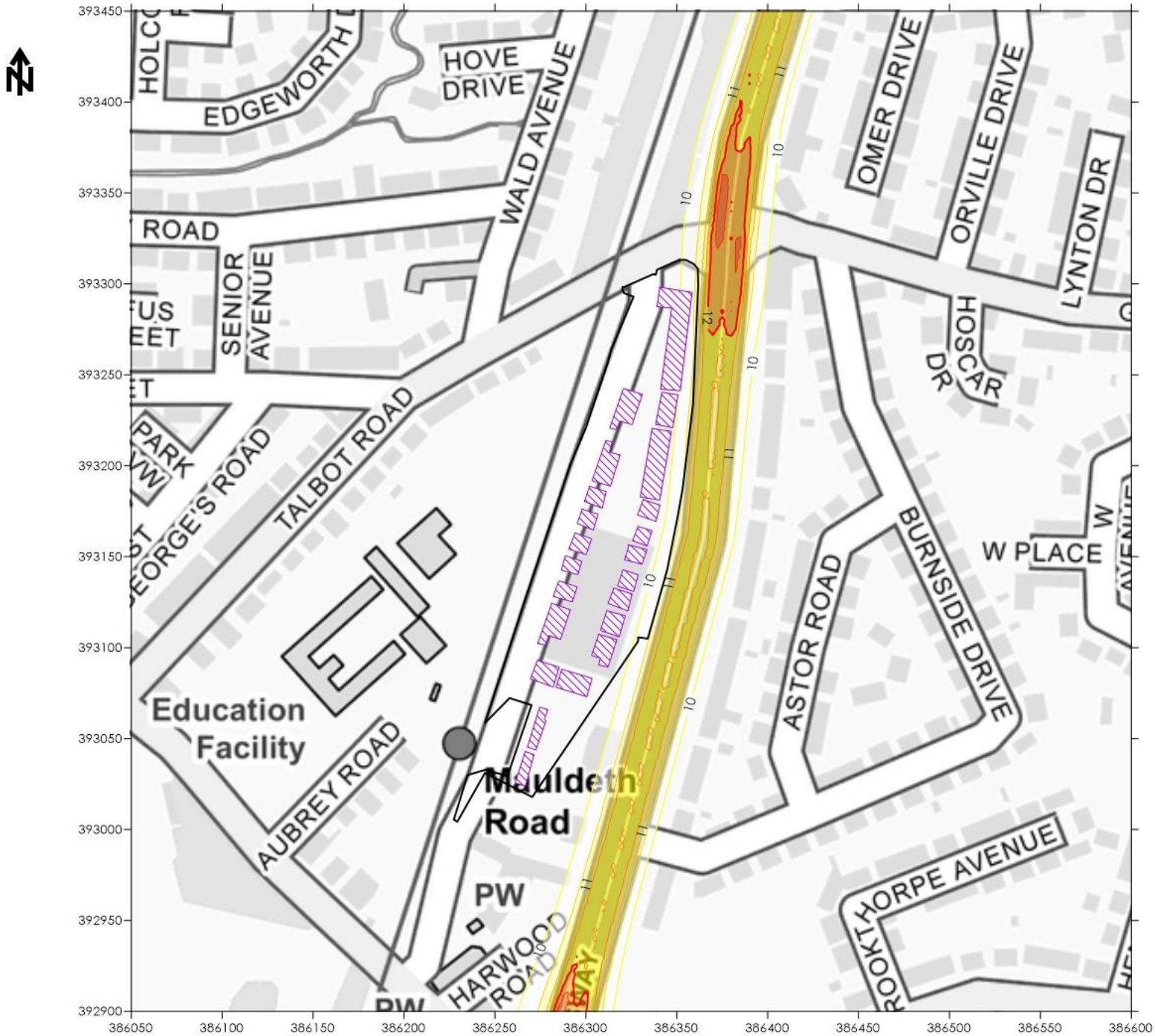

Legend

Site Boundary

Proposed Development

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

13
12.5
12
11.5
11
10.5
10

Title
Figure 7 - Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m³)

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Air Quality Assessment
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Project Reference
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Appendix 1 - Assessment Input Data

Introduction

The proposals have the potential to expose future occupants 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 2019 to allow verification against recent monitoring results and 2025 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:

386050, 392900 to 386600, 393450. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 4 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)[22]. 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 1999 to 2022. It should be noted that the DfT web tool is referenced in DEFRA guidance[23] 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.

The baseline traffic data was converted to the site 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.

Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards. 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)
		2019	2025			
L1	A5145 Wilmslow Road	25,443	27,357	3.2	10.4	45
L2	A5145 Wilmslow Road, Slow Phase (SP)	25,443	27,357	3.2	13.8	30
L3	A5145 Parrs Wood Lane, east of Wilmslow Road, SP	9,653	10,379	6.9	11.0	25

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

23 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)
		2019	2025			
L4	A5145 Parrs Wood Lane, west of Kingsway Road, SP	9,058	9,739	7.2	11.5	25
L5	A5145 Parrs Wood Lane, west of Kingsway Road, Eastbound (EB), SP	4,529	4,870	7.2	11.7	25
L6	A5145 Parrs Wood Lane/A34 Kingsway Junction	13,944	14,992	3.1	11.7	25
L7	A5145 Parrs Wood Lane, EB, SP	13,944	14,992	3.1	14.8	25
L8	A5145 Parrs Wood Lane, Westbound (WB), SP	3,486	3,748	3.1	5.8	25
L9	A5145 Parrs Wood Lane	17,430	18,740	3.1	10.6	45
L10	A34 Kingsway, Southbound (SB), SP towards Parrs Wood Lane junction	20,780	22,343	1.9	11.7	25
L11	A34 Kingsway, SB between Parrs Wood Lane junction SP and Mauldeth Road junction SP	20,780	22,343	1.9	7.7	65
L12	A34 Kingsway, Northbound (NB) between Parrs Wood Lane junction SP and Mauldeth Road junction SP	20,780	22,343	1.9	7.7	65
L13	A34 Kingsway, NB, between Parrs Wood Lane and Wilmslow Road junction, north	24,524	26,368	2.7	9.6	35
L14	A5145 Parrs Wood Lane, west of Kingsway Road, WB, SP	4,529	4,870	7.2	4.8	25
L15	A34 Kingsway, NB, between Wilmslow Road junction, north and Wilmslow Road junction, south	24,524	26,368	2.7	9.4	35
L16	A34 Kingsway, SB	24,524	26,368	2.7	9.9	35
L17	A5145, SB, SP	9,391	10,097	1.5	14.9	25
L18	A34 Kingsway, NB, between B5095 Wilmslow Road EB and A5145 Wilmslow Road WB, SP	24,487	26,328	2.3	7.6	25
L19	A34 Kingsway, NB, south of A5145, SP	31,988	34,393	1.7	9.5	25
L20	A34 Kingsway, NB, between Gawsworth Avenue and B5095 Wilmslow Road	24,114	25,928	1.7	12.7	30
L21	A34 Kingsway, NB, between Oakway and Gawsworth Avenue	24,114	25,928	1.7	6.8	65
L22	A34 Kingsway, SB, between Fairmile Drive and Gawsworth Avenue	24,114	25,928	1.7	6.8	65

Link		24-hour AADT Flow		HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2019	2025			
L23	A34 Kingsway, SB, between Gawsworth Avenue and Wilmslow Road	24,114	25,928	1.7	7.2	65
L24	A34 Kingsway, SB, adjacent to B5095 Wilmslow Road, SP	31,988	34,393	1.7	6.7	25
L25	A34 Kingsway, SB, south of A5145	31,988	34,393	1.7	11.9	35
L26	B5095, Wilmslow Road, SB	11,952	12,851	1.3	6.5	45
L27	A34 Kingsway NB, to B5095 Wilmslow Road Junction, SP	4,064	4,369	1.3	6.8	25
L28	B5095, Wilmslow Road to A34 Kingsway Junction NB, SP	4,064	4,369	1.3	6.9	25
L29	B5095, Wilmslow Road to A34 Kingsway Junction SB, SP	4,064	4,369	1.3	5.3	25
L30	B5095, Wilmslow Road, between Nuffield Health access point and A34 Kingsway junction	23,903	25,701	1.3	15.7	45
L31	B5095, Wilmslow Road	23,903	25,701	1.3	14	45
L32	A5145, NB	9,391	10,097	1.5	14.6	40
L33	A5145	18,782	20,195	1.5	11.7	45
L34	A34 Kingsway, SB from Mauldeth Road junction, SP	11,854	12,745	2.5	8.3	25
L35	A34 Kingsway, SB towards Mauldeth Road junction, SP	11,854	12,745	2.5	10.6	25
L36	A34 Kingsway, SB between Mauldeth Road junction SP and Talbot Road junction SP	11,854	12,745	2.5	7.5	65
L37	A34 Kingsway, SB from Talbot Road junction, SP	12,377	13,308	2.1	6.9	25
L38	A34 Kingsway to Mauldeth Road Junction NB, SP	12,377	13,308	2.1	6.3	25
L39	A34 Kingsway, north of Mauldeth Road Junction NB, SP	12,377	13,308	2.1	6.0	25
L40	A34 Kingsway NB, north of Mauldeth Road junction	12,377	13,308	2.1	7.6	65
L41	A34 Kingsway NB, approach to Talbot Road junction, SP	12,377	13,308	2.1	9.7	25

Link		24-hour AADT Flow		HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2019	2025			
L42	A34 Kingsway NB, north of Talbot Road, SP	12,377	13,308	2.1	6.0	25
L43	A34 Kingsway NB, north of Talbot Road	12,377	13,308	2.1	6.5	65
L44	A34 NB, to Moseley Road roundabout, SP	12,377	13,308	2.1	9.4	25
L45	Moseley Road roundabout	7,875	8,467	1.0	10.3	25
L46	Moseley Road, between Moseley Road roundabout and Birchfield Road	11,911	12,806	2.0	8.2	25
L47	Birchfield's Road roundabout	5,949	6,397	2.3	8.7	25
L48	Birchfield's Road	11,873	12,766	2.7	9.7	45
L49	B5093 Moseley Road, west of Birchfield's Road roundabout	11,911	12,806	2.0	14	45
L50	A5079 north exit off Moseley Road roundabout	11,108	11,943	2.0	7.2	45
L51	B5093 Moseley Road, approach to Moseley Road roundabout, SP	11,911	13,142	2.0	9.5	25
L52	B5093 Moseley Road	11,911	13,142	2.0	9.5	45
L53	B5093 Moseley Road, west of Slade Lane junction, SP	10,130	10,892	2.9	11.3	25
L54	B5093 Moseley Road, east of Slade Lane junction, SP	10,130	10,892	2.9	7.7	25
L55	Albert Road	10,130	10,892	2.9	6.7	45
L56	Albert Road, west of A6 Stockport Road junction, SP	10,130	10,892	2.9	5.6	25
L57	A6 Stockport Road, north of Albert Road junction, SP	22,764	24,476	3.5	12.5	25
L58	A6 Stockport Road north of Albert Road junction	22,764	24,476	3.5	11.6	45
L59	A6 Stockport Road, south of Albert Road junction, SP	22,764	24,476	3.5	12.4	25
L60	A6 Stockport Road south of Albert Road junction	22,764	24,476	3.5	9.5	45
L61	A34 Kingsway SB from Moseley Road roundabout, SP	11,854	12,745	2.5	9.2	25

Link		24-hour AADT Flow		HDV Prop. Of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2019	2025			
L62	A34 Kingsway SB, between Talbot Road junction SP and Moseley Road roundabout SP	11,854	12,745	2.5	8.0	65
L63	A34 Kingsway SB, approach to Talbot Road junction, SP	11,854	12,745	2.5	11.0	25

Reference should be made to Figure 4 for a graphical representation of the road link locations.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 12.0). This has been produced by DEFRA and incorporates COPERT 5.6 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, 2019 emission factors were utilised in preference to the scheme opening year in order to provide robust model outputs. As predictions for 2019 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Manchester Airport meteorological station over the period 1st January 2019 to 31st December 2019 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 10.1km 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 3 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 0.5m 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 'parkland and open suburbia'.

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 both the modelling extents and the meteorological site. 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

A review of DEFRA data and local monitoring results was undertaken in order to identify appropriate background values for use in the assessment. This indicated the annual mean NO_2 concentration recorded at the MA81NO monitor during 2019 was 23.1µg/m^3, higher than the DEFRA background for the grid square containing the development, as shown in Table 10. As such, the monitoring result was used in order to provide robust predictions.

Background PM_{10} and $PM_{2.5}$ concentrations from DEFRA mapping in lieu of local monitoring results.

Background concentrations from 2019 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 proposals.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance[24].

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.

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 2019 using traffic data, meteorological data and monitoring results from this year. The choice of 2019 as the verification year aligns with the IAQM position statement 'Use of 2020 and 2021 Monitoring Datasets'[25], which states:

> "If you are carrying out an air quality study that includes validation against monitoring data, use 2019 monitoring data as the last typical year"

MCC undertook monitoring of NO_2 concentrations at two locations within the vicinity of roads included within the model during 2019. The results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA

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

25 Use of 2020 and 2021 Monitoring Datasets, IAQM, 2021.

guidance[26]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table A1.2.

Table A1.2 NO_x Verification - Monitoring Results

Monitoring Location	Monitored NO_2 Concentration (µg/m³)	Calculated Road NO_x Concentration (µg/m³)
MA74NO	33.6	20.93
MA75NO	47.0	50.79

The annual mean road NO_x concentrations predicted from the dispersion model and the 2019 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.3.

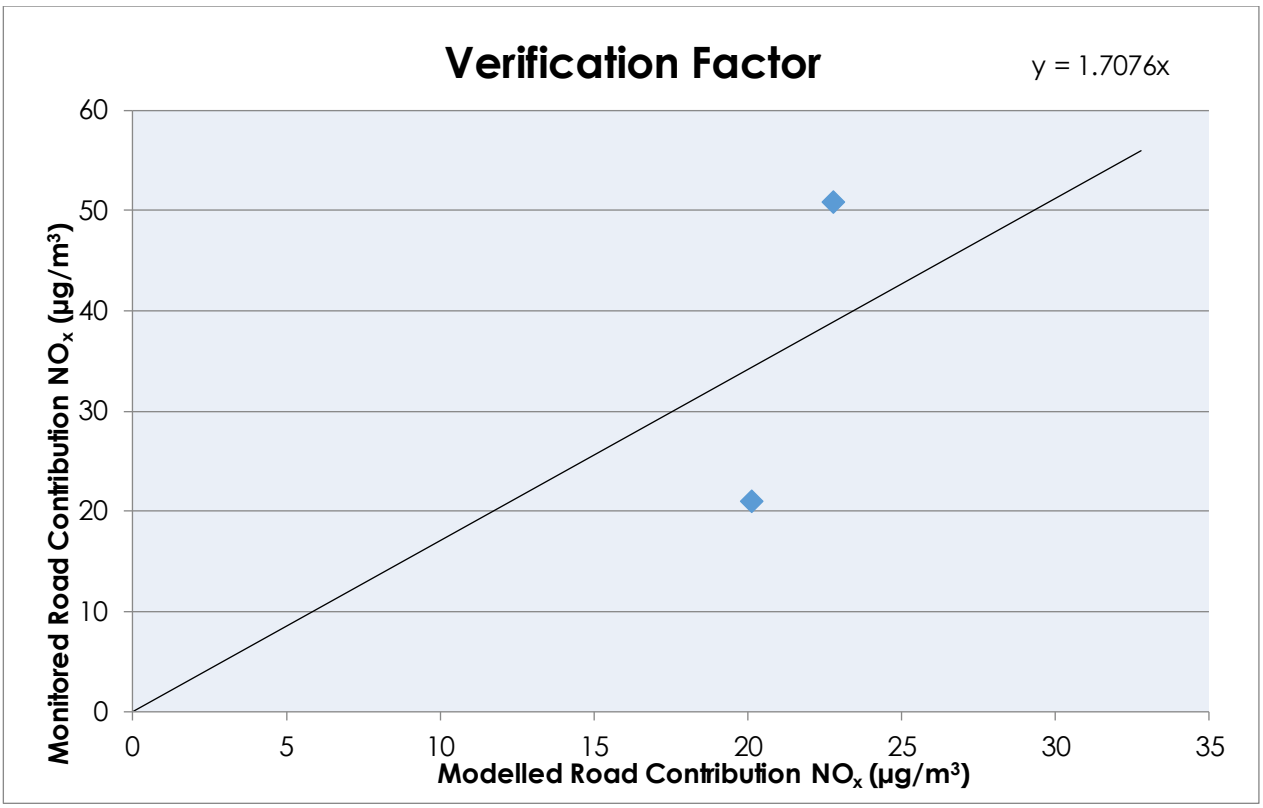
Table A1.3 NO_x Verification - Modelling Results

Monitoring Location	Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
MA74NO	20.93	20.13
MA75NO	50.79	22.79

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression though zero calculated. This indicated that a verification factor of 1.7076 was required to be applied to be applied to all road NO_x modelling results, as shown in Graph 1.

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

Graph 1 NO_x Verification Factor



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[27].

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

Appendix 2 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PIEMA, CEnv

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. 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.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.