

Air Quality Assessment

Sandbrook Park, Rochdale - Phase 2

Client: Northern Trust Company Limited

Reference: 3242-1r1

Date: 22nd November 2023



Report Issue

Report Title: Air Quality Assessment - Sandbrook Park, Rochdale - Phase 2

Report Reference: 3242-1

Field	Report Version			
	1	2	3	4
Prepared by	Olly Hanlon			
Position	Senior Air Quality Consultant			
Reviewed by	Alec Barnett			
Position	Air Quality Consultant			
Authorised by	Jethro Redmore			
Position	Director			
Date of Issue	22 nd November 2023			
Comment	-			

Serendipity Labs, Building 7, Exchange Quay, Salford, M5 3EP

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

This report has been prepared by Redmore Environmental Ltd in accordance with the agreed terms and conditions of appointment. Redmore Environmental Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Executive Summary

Redmore Environmental Ltd was commissioned by Northern Trust Company Limited to undertake an Air Quality Assessment in support of Phase 2 of a commercial development on land at Sandbrook Park, Rochdale.

The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken to determine baseline conditions and assess potential effects as a result of the scheme.

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 good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

Review of the dispersion modelling results indicated that predicted air quality impacts as a result of traffic generated by the development were not significant at any sensitive location in the vicinity of the site.

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

Table of Contents

1.0 INTRODUCTION	1
1.1 Background	1
1.2 Site Location and Context	1
2.0 LEGISLATION AND POLICY	2
2.1 Legislation	2
2.2 Local Air Quality Management	4
2.3 Dust	4
2.4 National Planning Policy	5
2.5 National Planning Practice Guidance	6
2.6 Local Planning Policy	7
3.0 METHODOLOGY	9
3.1 Introduction	9
3.2 Construction Phase Assessment	9
Step 1	10
Step 2	10
Step 3	15
Step 4	16
3.3 Operational Phase Assessment	16
4.0 BASELINE	19
4.1 Introduction	19
4.2 Local Air Quality Management	19
4.3 Air Quality Monitoring	19
4.4 Background Pollutant Concentrations	20
4.5 Sensitive Receptors	21
Construction Phase Sensitive Receptors	21
Operational Phase Sensitive Receptors	23
5.0 ASSESSMENT	25
5.1 Introduction	25
5.2 Construction Phase Assessment	25
Step 1	25
Step 2	25
Step 3	27
Step 4	29
5.3 Operational Phase Assessment	29

Predicted Concentrations	30
Predicted Impacts	33
Overall Impact Significance	35
6.0 CONCLUSION	37
7.0 ABBREVIATIONS	38

Appendices

Appendix 1 - Assessment Input Data

Appendix 2 - Curricula Vitae

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Northern Trust Company Limited to undertake an Air Quality Assessment in support of Phase 2 of a commercial development on land at Sandbrook Park, Rochdale.

1.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken to determine baseline conditions and assess potential effects as a result of the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land at Sandbrook Park, Rochdale, at approximate National Grid Reference (NGR): 389626, 411990. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the construction of 9 units to provide 1,544m² of industrial floor space alongside associated infrastructure and landscaping.

1.2.3 The development has the potential to cause air quality impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. An Air Quality Assessment was therefore undertaken to determine baseline conditions and assess 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:

- Nitrogen dioxide (NO₂);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- 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 2023¹. 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 2023² 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 The 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 ($\mu\text{g}/\text{m}^3$)	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 guidance³ 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 Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, 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 Framework⁴ (NPPF) was published in September 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 Guidance⁵ (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 Core Strategy⁶, part of the Rochdale Local Plan, was adopted by Rochdale Metropolitan Borough Council (RMBC) in October 2016. A review of the document indicated the following policies of relevance to this assessment:

"Policy G9 - Reducing the Impact of Pollution, Contamination and Land Instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

a) Focusing on measures that reduce air pollution in the Air Quality Management Areas, and other areas where pollution levels are unacceptable, particularly around motorways and main roads;

b) Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;

Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;

Requiring a Low Emissions Strategy (LES) where development requires a Transport Assessment, and in other circumstances as appropriate;

[...]

G) Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development."

"Policy DM1 - General Development Requirements

All development proposals, including changes of use of land and buildings, extensions and alterations, will be expected to demonstrate that they:

⁶ Basildon District Local Plan Saved Policies, BC, 2007.

[...]

d. Mitigate against any impacts due to noise, air, dust, light and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary;

[...]

f. Do not have an adverse impact on health, through its impact or the effect of existing problems e.g. land contamination, or poor air quality;

[...]."

"DM2 - Delivering Planning Contributions and Infrastructure

1. General approach

[...]

3. All types of development

For all types of development, including housing, we will seek contributions for any infrastructure or other measures necessary to mitigate any on site or off-site impacts from the development.

These contributions may cover, dependant on need:

[...]

Mitigation of compensation against environmental impacts e.g. noise, air quality (particularly in Air Quality Management Areas);

[...]."

2.6.2 The implications of the above policies have been taken into consideration throughout the assessment.

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. These have been 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 IAQM document 'Guidance on the Assessment of Dust from Demolition and Construction V2.1'⁷.

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 PM₁₀.

3.2.4 The assessment steps are detailed below.

⁷ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

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	Earthworks	• Total site area greater than 110,000m² • 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 75,000m³ - 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 18,000m² to 110,000m² - 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 12,000m³ to 75,000m³ - 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 18,000m² - 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 12,000m³ - 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

3.2.13 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 PM₁₀. 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

3.2.14 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.

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

3.2.16 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 350
High	More than 100	High	High	Low	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

3.2.17 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 200	Less than 350
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	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 200	Less than 350
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	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	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Low	-	1 or more	Low	Low	Low	Low

3.2.18 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	Medium	Medium
Medium	Medium	Low

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

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

3.2.20 Table 8 outlines the risk category from earthworks and construction activities.

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

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

3.2.21 Table 9 outlines the risk category from trackout activities.

Table 9 Construction Dust - Dust Risk Category from Trackout Activities

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

Step 3

3.2.22 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance⁸ to reduce potential dust impacts based upon the relevant risk categories

⁸ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

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

3.2.23 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**.

3.2.24 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

3.3.1 The development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. Potential impacts have therefore been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2019 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2025 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2025 should the proposals be completed).

3.3.2 Reference should be made to Appendix 1 for assessment input data and details of the verification process.

3.3.3 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance

provided within the Design Manual for Roads and Bridges (DMRB)⁹ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance¹⁰ on where the AQOs apply, as summarised in Table 2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the development.

- 3.3.4 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'¹¹. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 10.

Table 10 Significance of Operational Phase Road Vehicle Exhaust Emissions Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO/ Interim Target (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO/ Interim Target	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/ Interim Target	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO/ Interim Target	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO/ Interim Target	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/ Interim Target	Moderate	Substantial	Substantial	Substantial

- 3.3.5 The matrix shown in Table 10 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

- 3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document¹² provides guidance on determining the overall air quality impact significance of the

⁹ LA 105: Air Quality, Highways England, 2019.

¹⁰ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

¹¹ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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

operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and,
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

3.3.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

3.3.8 The determination of significance relies on professional judgement and reasoning has been provided as far as practicable. The IAQM guidance¹³ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

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), RMBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the borough. As such, a number of roads within Rochdale have been included within the Greater Manchester Combined Authority (GMCA) AQMA. This is described as follows:

"This is part of the GMCA AQMA located within the Rochdale Council area."

- 4.2.2 The development is located approximately 320m to the north-north-west of 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 RMBC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMA's have been designated.

4.3 Air Quality Monitoring

- 4.3.1 Monitoring of pollutant levels is undertaken by RMBC throughout their area of jurisdiction. Recent NO₂ concentrations recorded in the vicinity of the development are shown in Table 11. Exceedences of the AQO are shown in **bold**.

Table 11 Monitoring Results

Monitoring Site	Monitored NO ₂ Concentration (µg/m ³)			
	2019	2020	2021	2022
RO7ANO	32.1	25.2	27.7	26.4
RO8ANO	44.7	33.6	36.6	36.3
RO9ANO	39.6	30.3	34.9	36.4

4.3.2 As shown in Table 11, annual mean NO₂ concentrations were above the AQO at RO8ANO in 2019. Levels have since decreased to below 40µg/m³ in recent years. Annual mean NO₂ concentrations were below the AQO at all remaining positions between 2019 and 2022. Reference should be made to Figure 2 for a map of the survey sites.

4.3.3 Pollutant concentrations recorded during 2020 and 2021 were affected by changes to travel patterns associated with the COVID-19 pandemic. The result should therefore be viewed with caution.

4.3.4 RMBC do not undertake PM₁₀ or PM_{2.5} monitoring within the vicinity of the site.

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: 389500, 411500. Data for these locations was downloaded from the DEFRA website¹⁴ for the purpose of the assessment and is summarised in Table 12.

Table 12 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2019	2023	2025
NO ₂	17.40	14.51	13.31
PM ₁₀	12.41	11.85	11.65

¹⁴ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2019	2023	2025
PM _{2.5}	8.30	7.89	7.74

4.4.2 As shown in Table 12, predicted background NO₂, PM₁₀ 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 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 13.

Table 13 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 350	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 14.

Table 14 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 15.

Table 15 Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The baseline review indicated that construction was recently completed for Phase 1 of the development (reference: 19/00310/FUL). It is possible this caused dust generation in the local area over recent years
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site
Pre-existing screening between the source and the receptors	Trees are located along the eastern site boundary. 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 of the development 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 possible that it will extend over one year. The sensitivity of the surrounding area is unlikely to change during this period

Guidance	Comment
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 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 16.

Table 16 Sensitivity of the Surrounding Area to Potential Dust Impacts

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

Operational Phase Sensitive Receptors

4.5.8 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 17.

Table 17 Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Manchester Road	388581.1	411894.5
R2	Residential - Manchester Road	388687.7	411960.2
R3	Residential - Rufford Avenue	388702.9	411901.4
R4	Residential - Dunlop Avenue	389194.6	411484.8
R5	Residential - Dunlop Avenue	389227.5	411452.7
R6	Residential - Dunlop Avenue	389268.7	411415.5

Receptor		NGR (m)	
		X	Y
R7	Residential - Queensway	389331.0	411378.2
R8	Residential - Queensway	389415.0	411474.1
R9	Education Facility - Sandbrook Way	389347.0	411841.6
R10	Residential - Queensway	389203.3	411275.5
R11	Education Facility - Queensway	389434.3	411394.7

4.5.9 Reference should be made to Figure 4 for a map of the road vehicle exhaust emission sensitive receptor locations.

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. These are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

- 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.

Step 2

Earthworks

- 5.2.4 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed development site is less than 18,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

5.2.5 Table 16 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for dust soiling as a result of earthworks.

5.2.6 Table 16 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for human health impacts as a result of earthworks.

Construction

5.2.7 The total building volume to be constructed is estimated to be between 12,000m³ and 75,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **medium**.

5.2.8 Table 16 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of construction activities.

5.2.9 Table 16 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health impacts as a result of construction activities.

Trackout

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

5.2.11 Table 16 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, the development is considered to be a **low** risk site for dust soiling as a result of trackout.

5.2.12 Table 16 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 trackout.

Summary of the Risk of Dust Effects

5.2.13 A summary of the risk from each dust generating activity is provided in Table 18.

Table 18 Summary of Potential Unmitigated Dust Risks During Construction

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

5.2.14 As indicated in Table 18, the potential risk of dust soiling is **medium** from construction and **low** from earthworks and trackout. The potential risk of human health impacts is **low** from construction and **negligible** from earthworks and trackout.

5.2.15 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

5.2.16 The IAQM guidance¹⁵ 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 19. 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.

¹⁵ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

Table 19 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), 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
Monitoring	• 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
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 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 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 • Produce a Construction Logistics Plan to manage the sustainable delivery of goods

Issue	Control Measure
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
Earthworks	• Revegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as possible • Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover topsoil, as soon as practicable • Only remove the cover in small areas during work and not all at once
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport • Implement a wheel washing system, if required • Access gates to be located at least 10m from receptors where possible

Step 4

5.2.17 Assuming the relevant mitigation measures outlined in Table 19 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁶.

5.3 Operational Phase Assessment

5.3.1 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. An assessment was therefore

¹⁶ Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

undertaken using dispersion modelling to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site.

5.3.2 The assessment included the following scenarios:

- 2019 - Verification;
- 2025 - DM; and,
- 2025 - DS.

5.3.3 The DM scenario (i.e. without development) included baseline traffic data, inclusive of anticipated growth for the relevant assessment year. The DS scenario (i.e. with development) included baseline traffic data, inclusive of anticipated growth for the relevant assessment year, in addition to predicted vehicle trips associated with the operation of the proposals.

5.3.4 For the purpose of the assessment traffic data for 2025 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2019 were utilised within the dispersion model. The use of 2025 traffic data and 2019 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

5.3.5 Reference should be made to Appendix 1 for full assessment input details.

Predicted Concentrations

5.3.6 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 20.

Table 20 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Manchester Road	32.33	32.34	0.01
R2	Residential - Manchester Road	38.38	38.39	0.01

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R3	Residential - Rufford Avenue	26.48	26.49	0.01
R4	Residential - Dunlop Avenue	31.83	31.85	0.02
R5	Residential - Dunlop Avenue	31.33	31.34	0.01
R6	Residential - Dunlop Avenue	30.14	30.15	0.01
R7	Residential - Queensway	24.48	24.48	0.00
R8	Residential - Queensway	28.99	29.00	0.01
R9	Education Facility - Sandbrook Way	20.44	20.46	0.02
R10	Residential - Queensway	21.23	21.23	0.00
R11	Education Facility - Queensway	19.95	19.95	0.00

5.3.7 As indicated in Table 20, predicted annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios.

5.3.8 Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO₂ concentrations for the DM and DS scenarios, respectively.

5.3.9 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 21.

Table 21 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Manchester Road	14.87	14.87	0.002
R2	Residential - Manchester Road	16.06	16.06	0.002
R3	Residential - Rufford Avenue	13.64	13.64	0.001
R4	Residential - Dunlop Avenue	14.93	14.94	0.004
R5	Residential - Dunlop Avenue	14.74	14.74	0.004

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R6	Residential - Dunlop Avenue	14.32	14.32	0.003
R7	Residential - Queensway	13.21	13.21	0.002
R8	Residential - Queensway	14.18	14.18	0.002
R9	Education Facility - Sandbrook Way	12.46	12.47	0.003
R10	Residential - Queensway	12.64	12.64	0.001
R11	Education Facility - Queensway	12.37	12.37	0.001

5.3.10 As indicated in Table 21, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios.

5.3.11 Reference should be made to Figures 7 and 8 for graphical representations of annual mean PM₁₀ concentrations for the DM and DS scenarios, respectively.

5.3.12 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Manchester Road	9.78	9.79	0.02
R2	Residential - Manchester Road	10.49	10.49	0.02
R3	Residential - Rufford Avenue	9.07	9.07	0.01
R4	Residential - Dunlop Avenue	9.81	9.82	0.02
R5	Residential - Dunlop Avenue	9.71	9.71	0.02
R6	Residential - Dunlop Avenue	9.47	9.47	0.01
R7	Residential - Queensway	8.82	8.83	0.00
R8	Residential - Queensway	9.38	9.39	0.02

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R9	Education Facility - Sandbrook Way	8.39	8.39	0.02
R10	Residential - Queensway	8.49	8.49	0.00
R11	Education Facility - Queensway	8.34	8.34	0.00

5.3.13 As indicated in Table 22, predicted annual mean PM_{2.5} concentrations were below the Interim Target at all sensitive receptors in both the DM and DS scenarios.

5.3.14 Reference should be made to Figures 9 and 10 for graphical representations of annual mean PM_{2.5} concentrations for the DM and DS scenarios, respectively.

Predicted Impacts

5.3.15 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23 Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Manchester Road	76 - 94% of AQO	0	Negligible
R2	Residential - Manchester Road	95 - 102% of AQO	0	Negligible
R3	Residential - Rufford Avenue	Below 75% of AQO	0	Negligible
R4	Residential - Dunlop Avenue	76 - 94% of AQO	0	Negligible
R5	Residential - Dunlop Avenue	76 - 94% of AQO	0	Negligible
R6	Residential - Dunlop Avenue	76 - 94% of AQO	0	Negligible
R7	Residential - Queensway	Below 75% of AQO	0	Negligible
R8	Residential - Queensway	Below 75% of AQO	0	Negligible
R9	Education Facility - Sandbrook Way	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R10	Residential - Queensway	Below 75% of AQO	0	Negligible
R11	Education Facility - Queensway	Below 75% of AQO	0	Negligible

5.3.16 As indicated in Table 23, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.17 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24 Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Manchester Road	Below 75% of AQO	0	Negligible
R2	Residential - Manchester Road	Below 75% of AQO	0	Negligible
R3	Residential - Rufford Avenue	Below 75% of AQO	0	Negligible
R4	Residential - Dunlop Avenue	Below 75% of AQO	0	Negligible
R5	Residential - Dunlop Avenue	Below 75% of AQO	0	Negligible
R6	Residential - Dunlop Avenue	Below 75% of AQO	0	Negligible
R7	Residential - Queensway	Below 75% of AQO	0	Negligible
R8	Residential - Queensway	Below 75% of AQO	0	Negligible
R9	Education Facility - Sandbrook Way	Below 75% of AQO	0	Negligible
R10	Residential - Queensway	Below 75% of AQO	0	Negligible
R11	Education Facility - Queensway	Below 75% of AQO	0	Negligible

5.3.18 As indicated in Table 24, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.19 Predicted impacts on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 25.

Table 25 Predicted Impacts - PM_{2.5}

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Concentration Change as Proportion of Interim Target (%)	Impact Significance
R1	Residential - Manchester Road	76 - 94% of Interim Target	0	Negligible
R2	Residential - Manchester Road	76 - 94% of Interim Target	0	Negligible
R3	Residential - Rufford Avenue	76 - 94% of Interim Target	0	Negligible
R4	Residential - Dunlop Avenue	76 - 94% of Interim Target	0	Negligible
R5	Residential - Dunlop Avenue	76 - 94% of Interim Target	0	Negligible
R6	Residential - Dunlop Avenue	76 - 94% of Interim Target	0	Negligible
R7	Residential - Queensway	Below 75% of Interim Target	0	Negligible
R8	Residential - Queensway	76 - 94% of Interim Target	0	Negligible
R9	Education Facility - Sandbrook Way	Below 75% of Interim Target	0	Negligible
R10	Residential - Queensway	Below 75% of Interim Target	0	Negligible
R11	Education Facility - Queensway	Below 75% of Interim Target	0	Negligible

5.3.20 As indicated in Table 25, impacts on annual mean PM_{2.5} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

Overall Impact Significance

5.3.21 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 26.

Table 26 Overall Road Vehicle Exhaust Emissions Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were below the relevant AQOs and Interim Target at all locations in the DM scenario The predictions are unlikely to change in the absence of the proposals given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs or Interim Target
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	It is assumed that vehicle exhaust emission rates and background pollution levels will not reduce in future years. This provides worst-case results when compared with the DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

5.3.22 The IAQM guidance¹⁷ states that only if the impact is greater than **slight**, the effect is considered **significant**. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

¹⁷ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

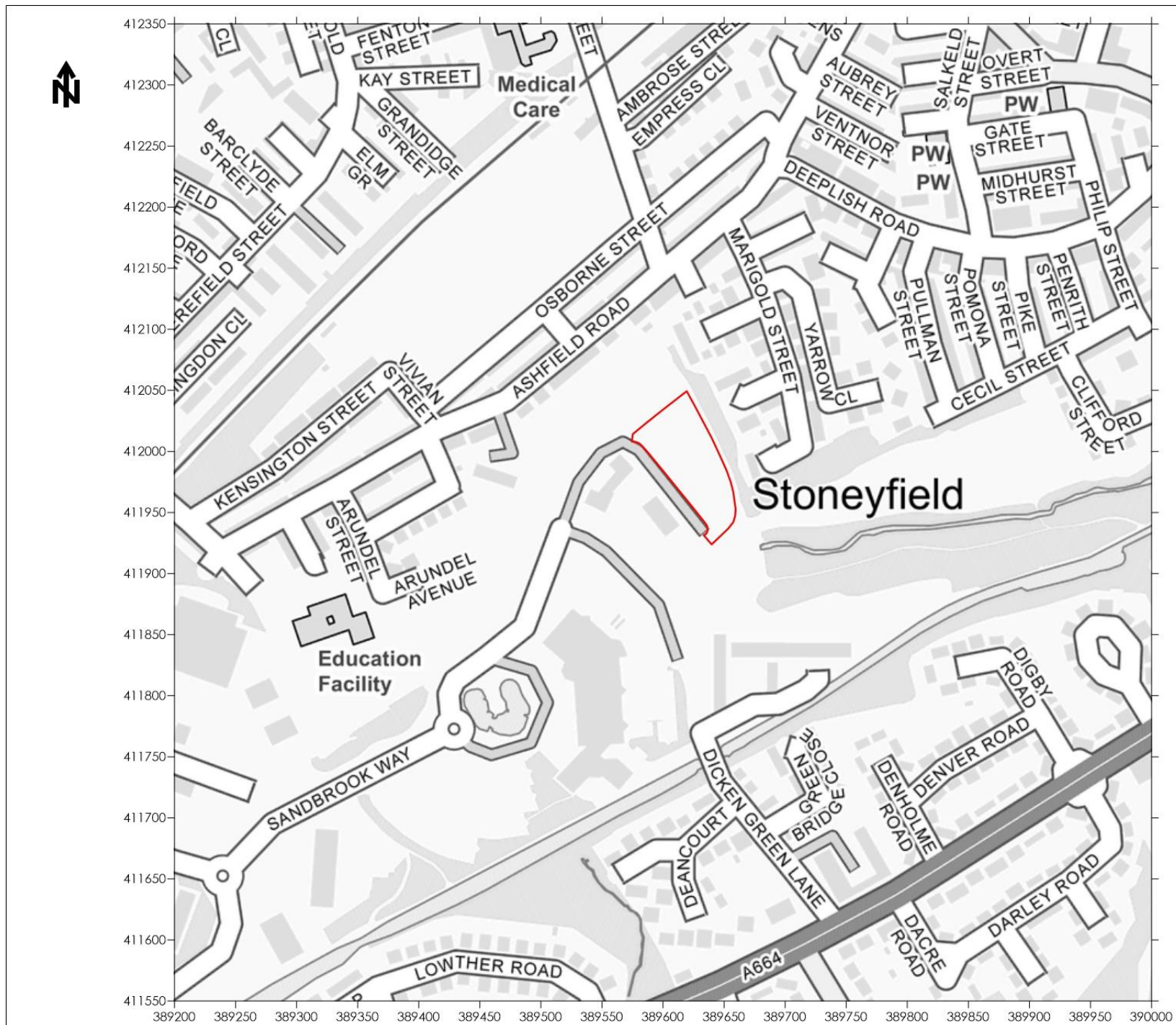
6.0 CONCLUSION

- 6.1.1 Redmore Environmental Ltd was commissioned by Northern Trust Company Limited to undertake an Air Quality Assessment in support of Phase 2 of a commercial development on land at Sandbrook Park, Rochdale.
- 6.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of 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 earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.
- 6.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic generated by the development were predicted to be **negligible** at all sensitive receptor locations. Following consideration of the relevant issues, air quality impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.
- 6.1.6 Based on the assessment results, air quality factors are not considered a constraint to 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
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EB	Eastbound
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
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
RMBC	Rochdale Metropolitan Borough Council
SB	Southbound
SP	Slow Phase
WB	Westbound
Z ₀	Roughness length

Figures



Legend



Site Boundary

Title

Figure 1 - Site Location Plan

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

3242-1

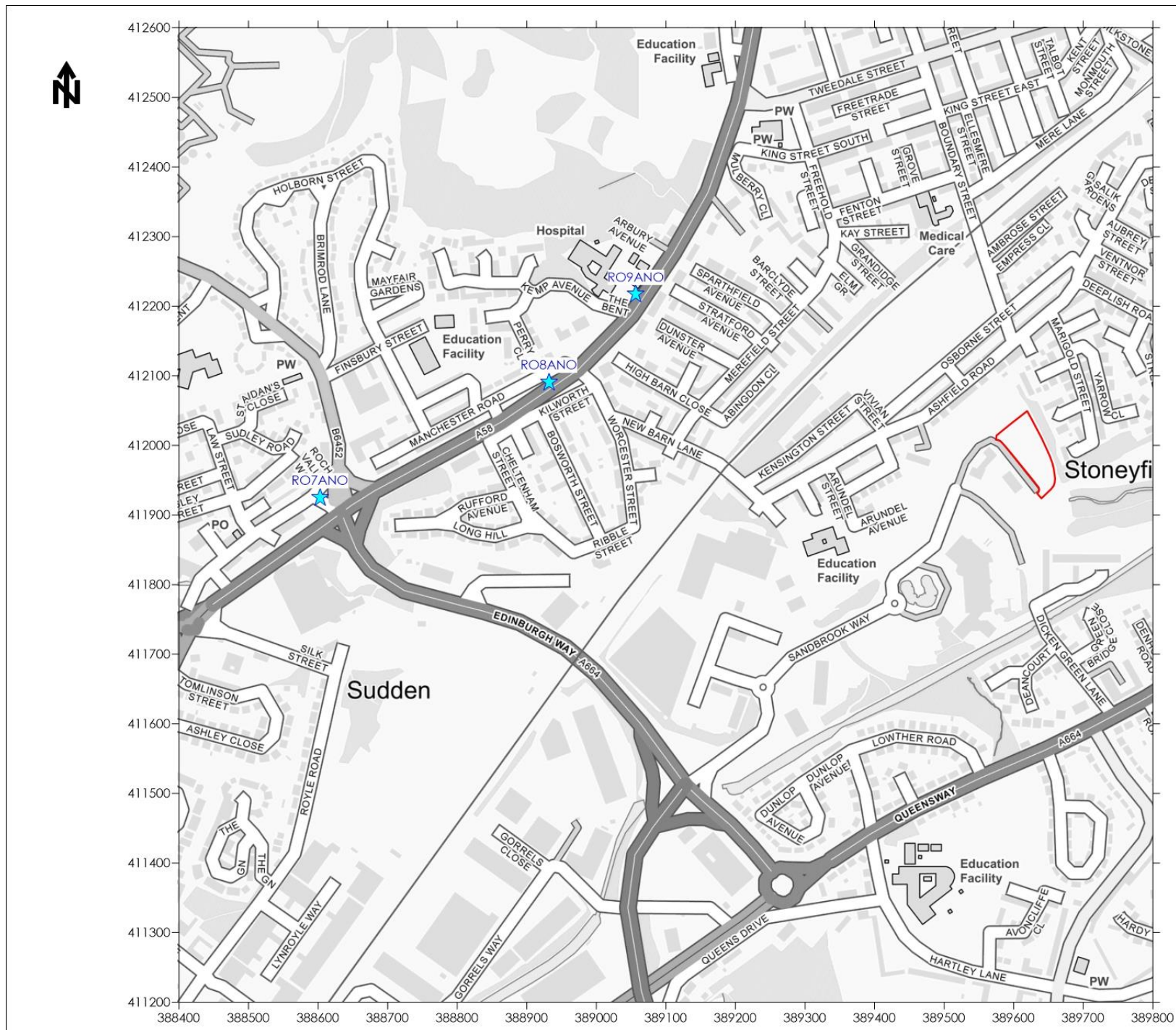
Client

Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



www.red-env.co.uk | 0161 7060075



Legend



Site Boundary



Monitor

Title

Figure 2 - Monitoring Locations

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

3242-1

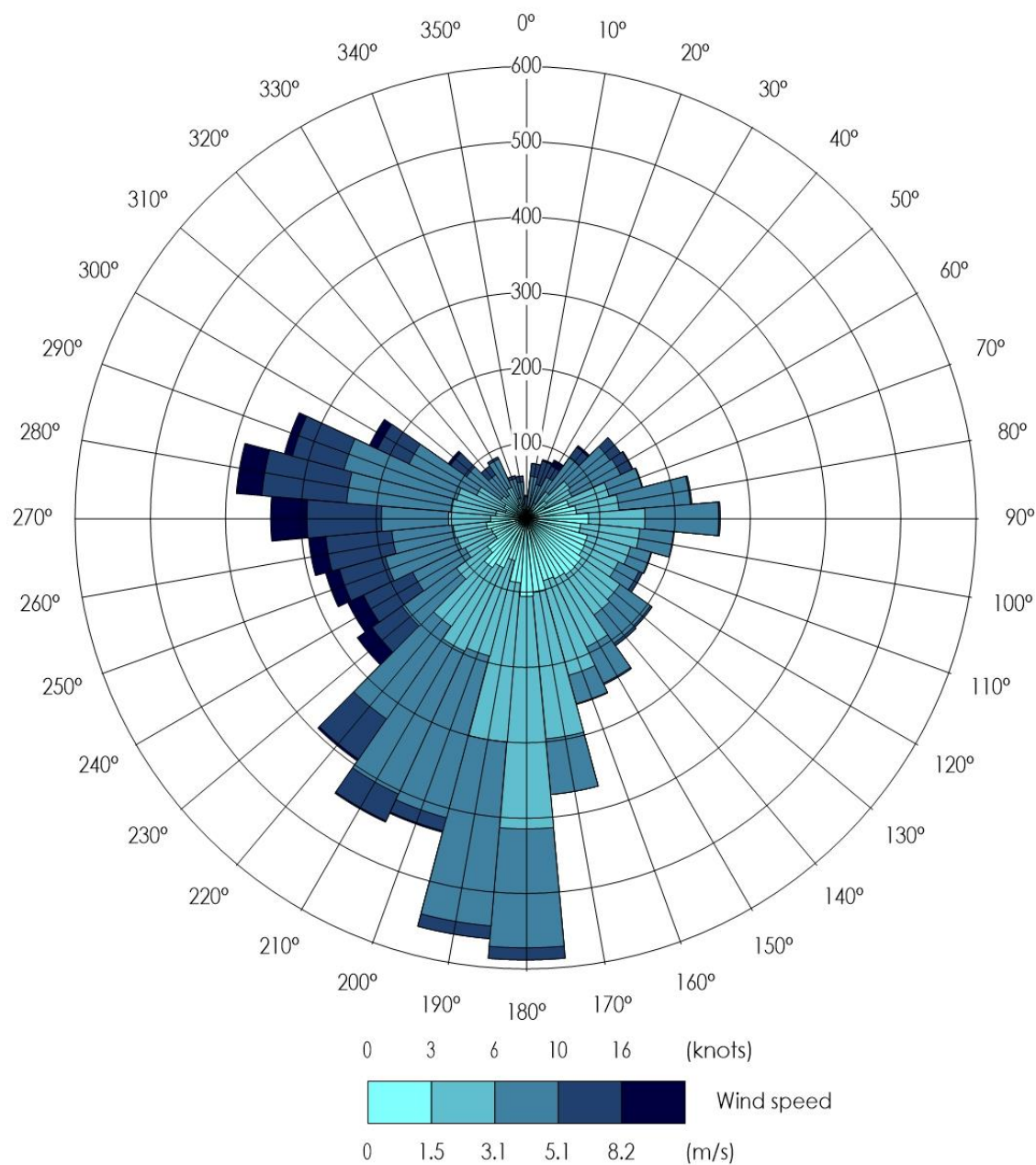
Client

Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



www.red-env.co.uk | 0161 7060075



Legend

Title

Figure 3 - Wind Rose of 2019
Manchester Airport Meteorological Data

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

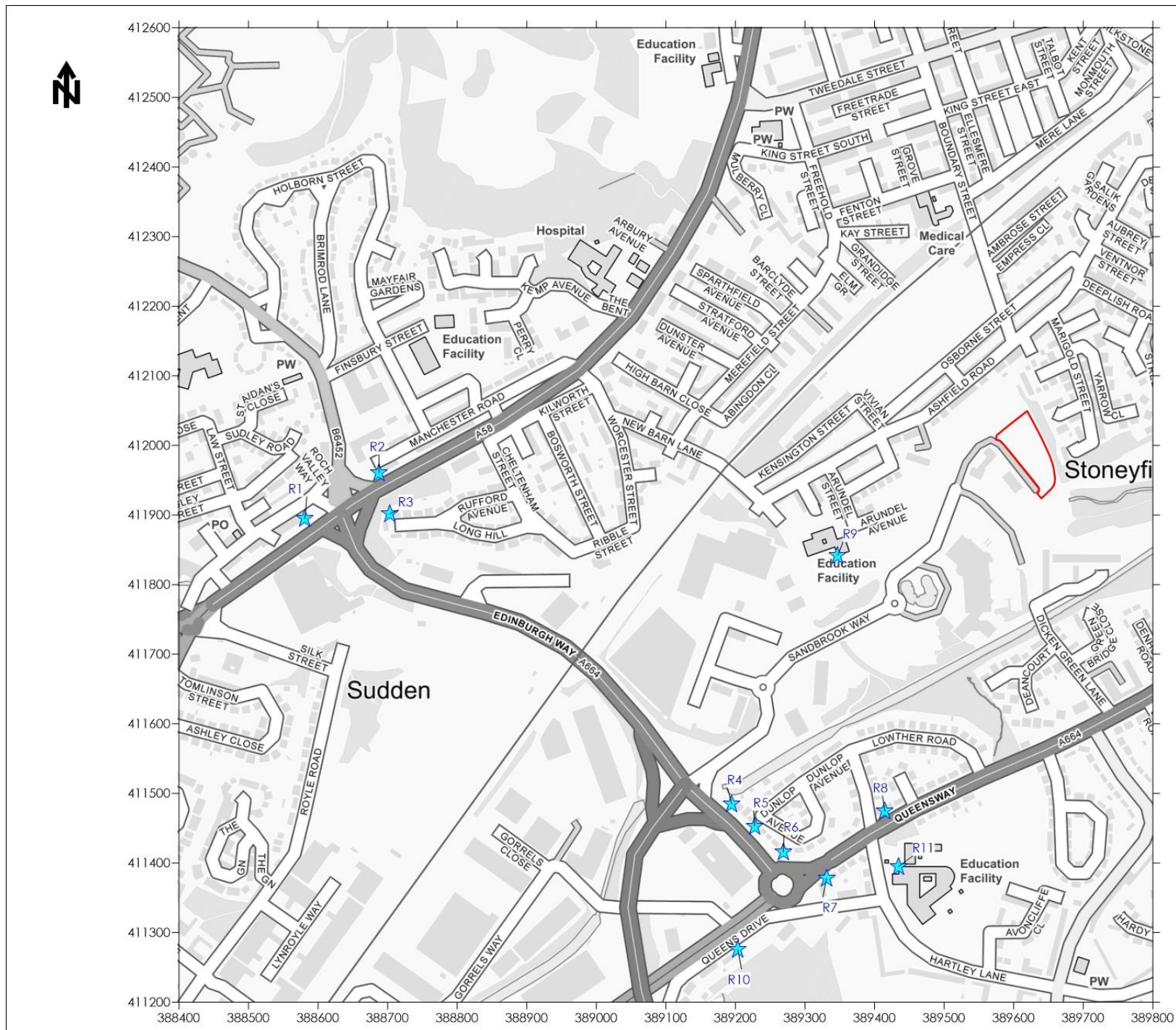
3242-1

Client

Northern Trust Company Limited



www.red-env.co.uk | 0161 7060075



Legend



Site Boundary



Sensitive Receptor

Title

Figure 4 - Road Vehicle Exhaust Emissions Sensitive Receptor Locations

Project

Air Quality Assessment, Sandbrook Park, Phase 2, Rochdale

Project Reference

3242-1

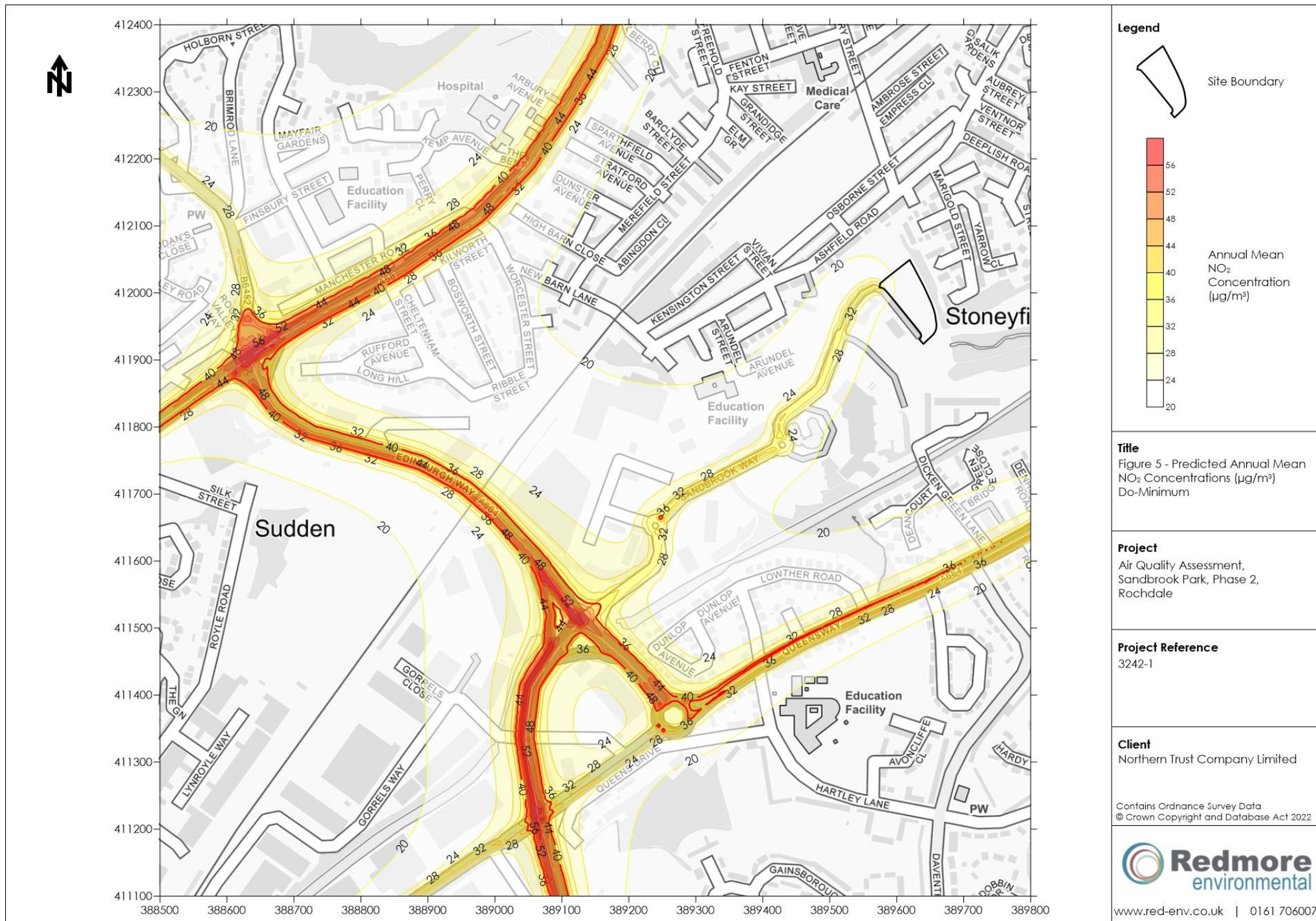
Client

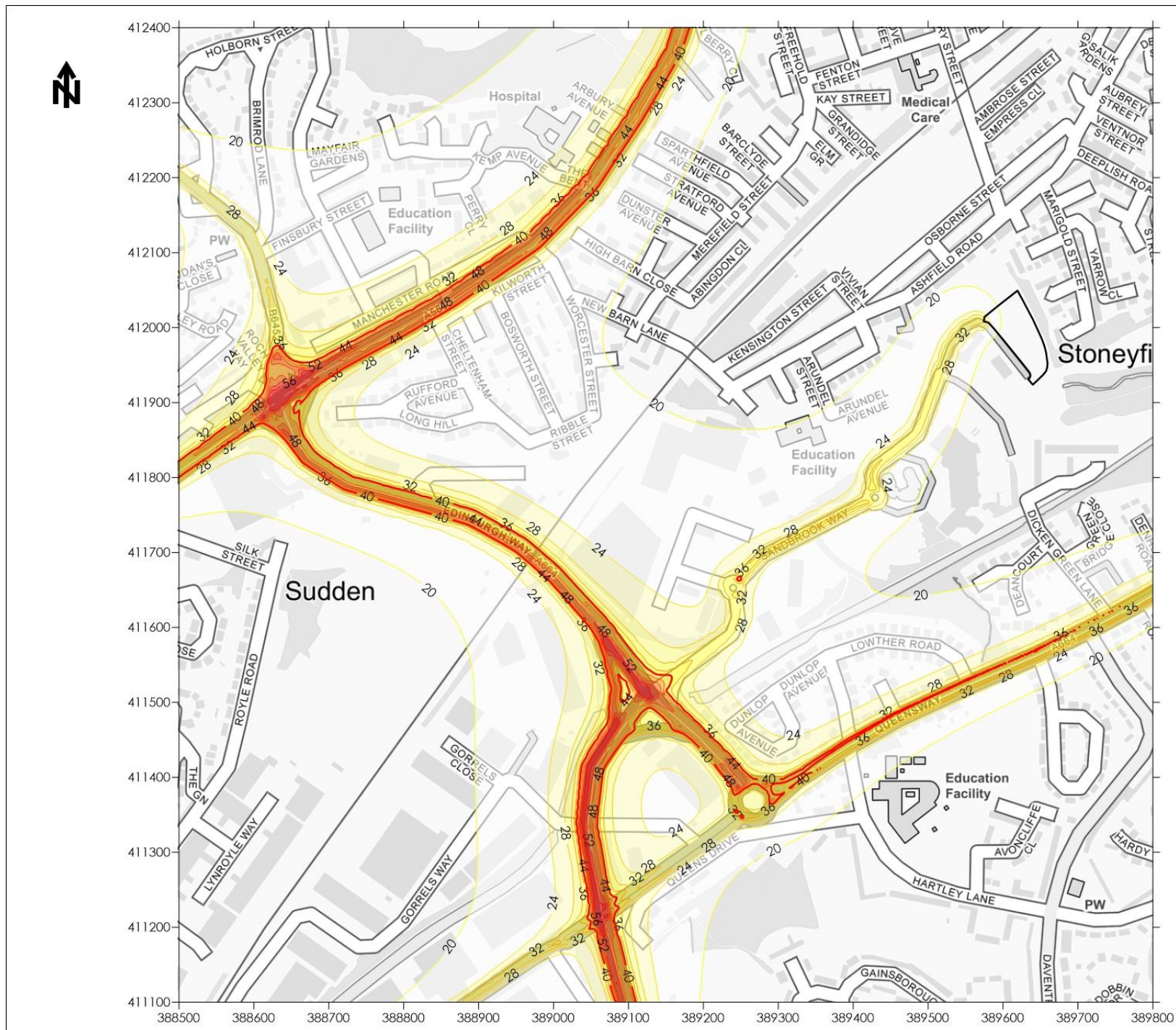
Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



www.red-env.co.uk | 0161 7060075

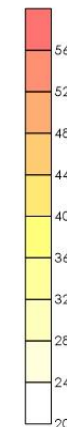




Legend



Site Boundary



Annual Mean
NO₂
Concentration
(µg/m³)

Title

Figure 6 - Predicted Annual Mean
NO₂ Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

3242-1

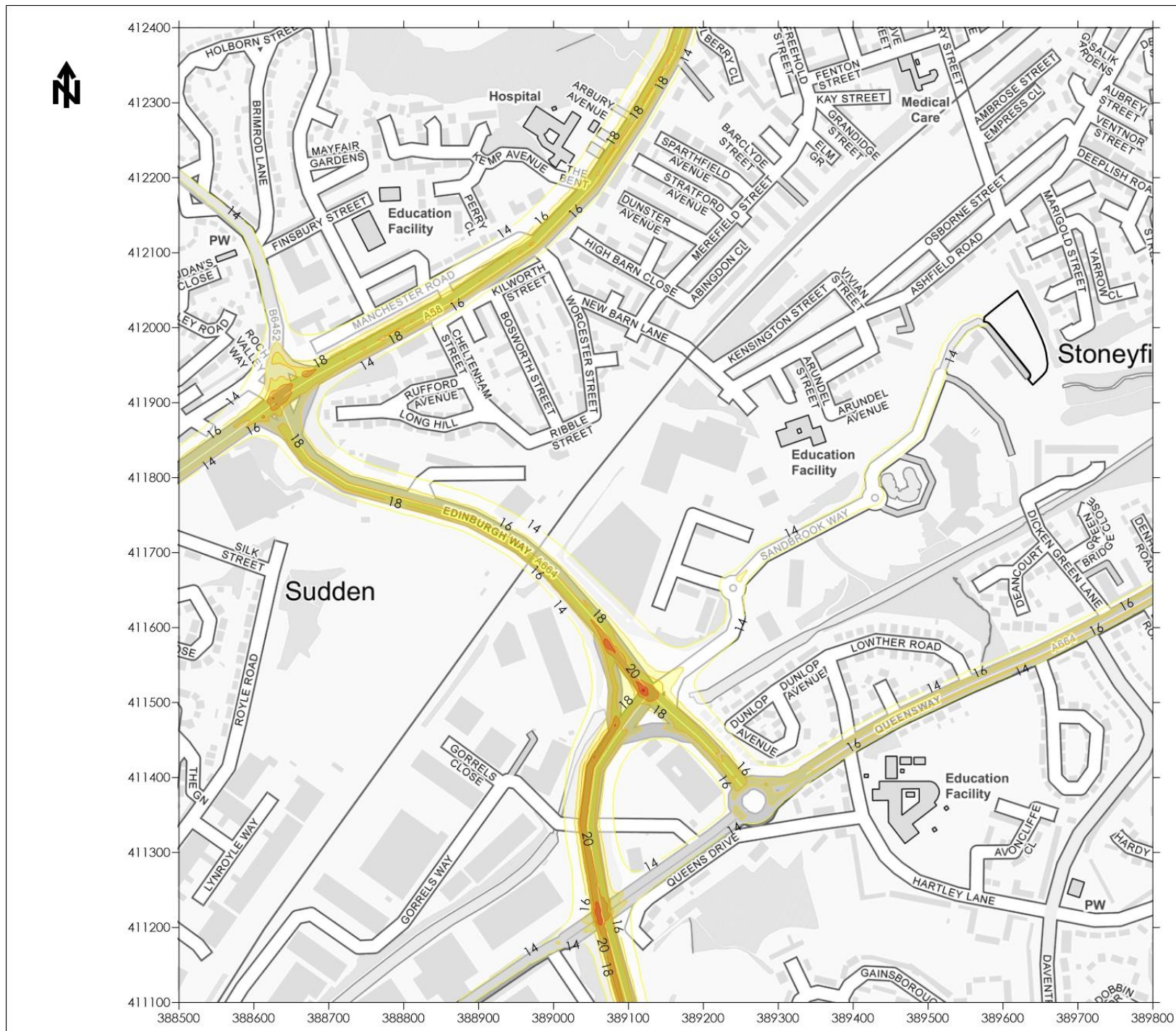
Client

Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



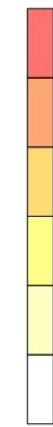
www.red-env.co.uk | 0161 7060075



Legend



Site Boundary



Annual Mean
PM₁₀
Concentration
($\mu\text{g}/\text{m}^3$)

Title

Figure 7 - Predicted Annual Mean
PM₁₀ Concentrations ($\mu\text{g}/\text{m}^3$)
Do-Minimum

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

3242-1

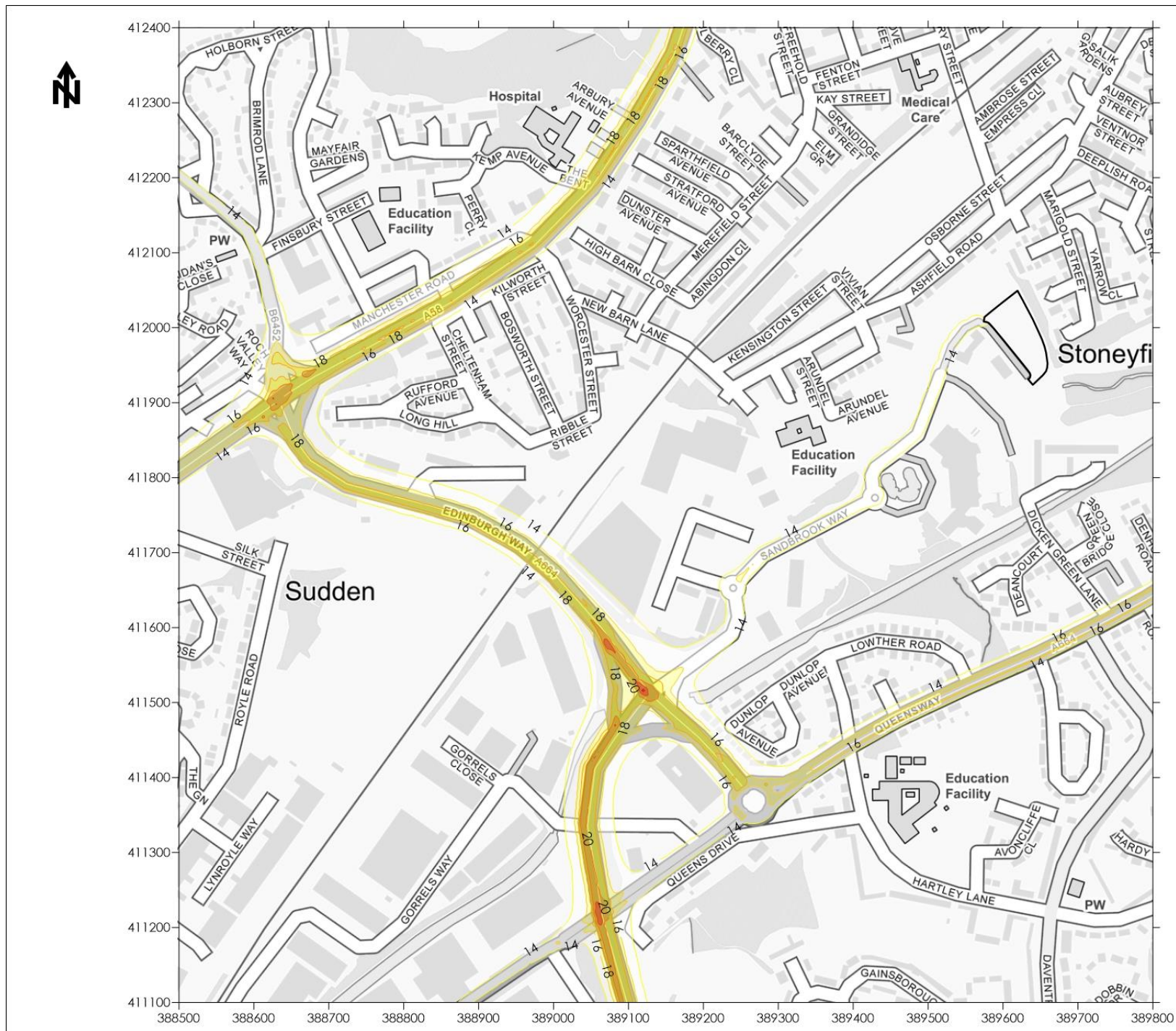
Client

Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



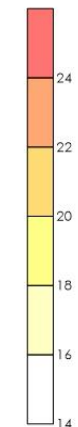
www.red-env.co.uk | 0161 7060075



Legend



Site Boundary



Annual Mean
PM₁₀
Concentration
($\mu\text{g}/\text{m}^3$)

Title

Figure 8 - Predicted Annual Mean
PM₁₀ Concentrations ($\mu\text{g}/\text{m}^3$)
Do-Something

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

3242-1

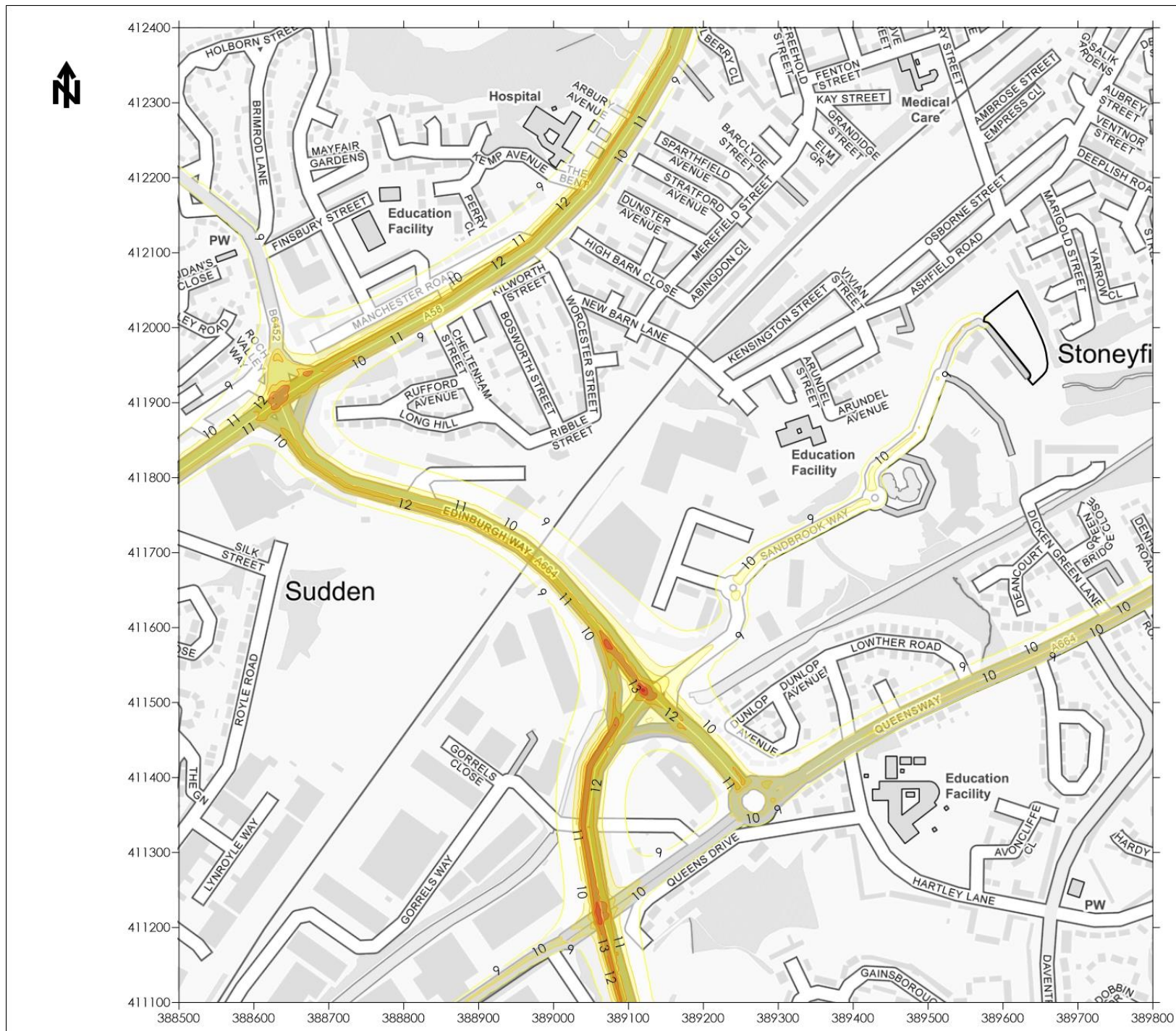
Client

Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



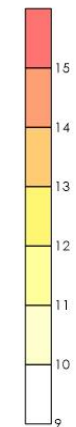
www.red-env.co.uk | 0161 7060075



Legend



Site Boundary



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

Title

Figure 9 - Predicted Annual Mean
PM_{2.5} Concentrations (µg/m³)
Do-Minimum

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

3242-1

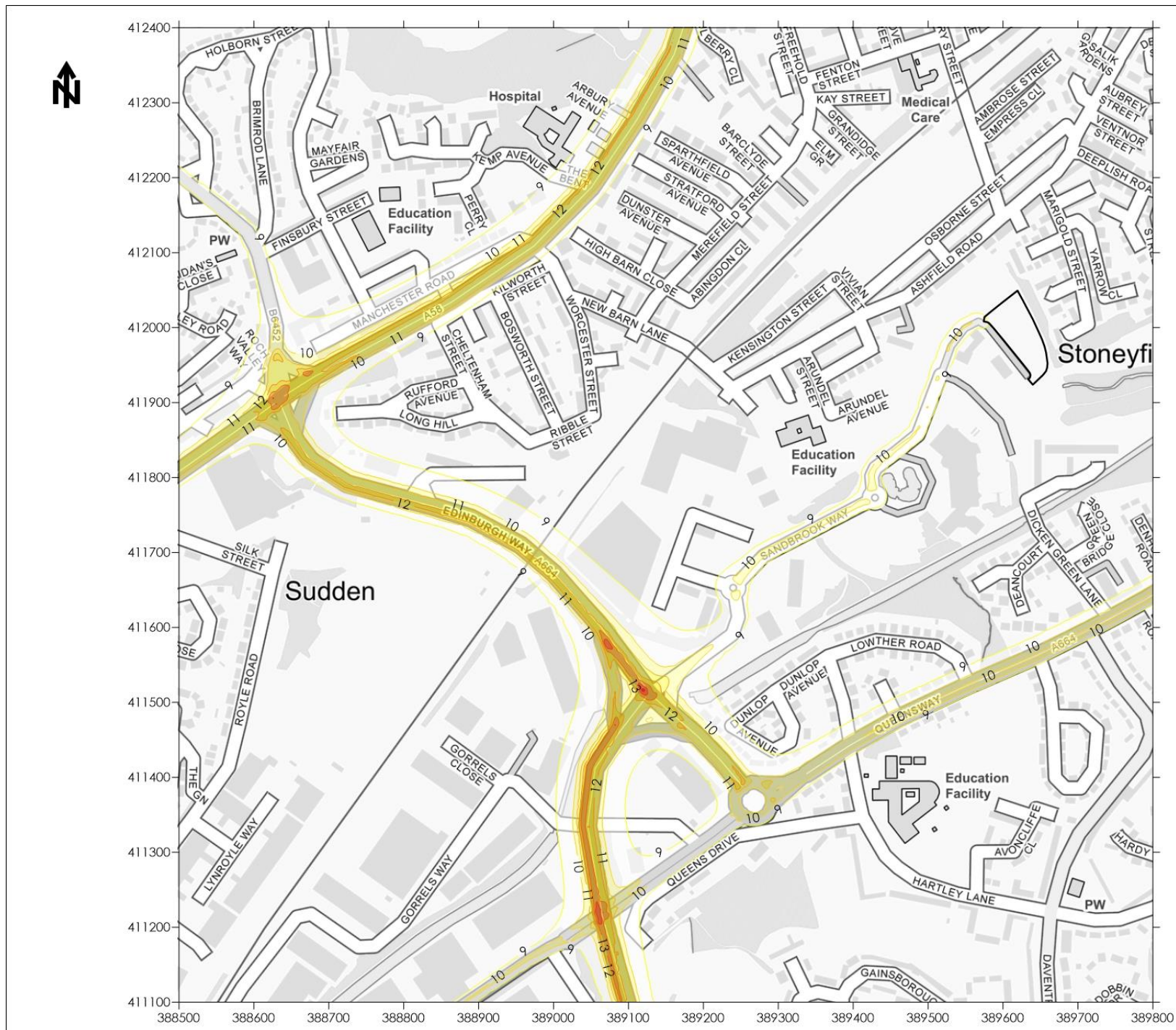
Client

Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



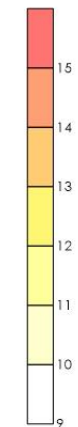
www.red-env.co.uk | 0161 7060075



Legend



Site Boundary



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

Title

Figure 10 - Predicted Annual Mean
PM_{2.5} Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment,
Sandbrook Park, Phase 2,
Rochdale

Project Reference

3242-1

Client

Northern Trust Company Limited

Contains Ordnance Survey Data
© Crown Copyright and Database Act 2022



www.red-env.co.uk | 0161 7060075

Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to cause air quality impacts as a result of exhaust emissions associated with vehicles travelling to and from the site. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

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 relevant inputs are detailed in the following Sections.

Assessment Area

Ambient concentrations were predicted over the area NGR: 388500, 411100 to 389800, 412400. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

Receptors sensitive to potential changes in pollutant concentrations were included in the assessment as outlined in the main report text.

Reference should be made to Figure 11 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Baseline traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was obtained from the Air Quality Assessment¹⁸ (reference: 3242r1) undertaken by Redmore Environmental Ltd in support of Phase 1 of the scheme.

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 Department for Transport (DfT) to calculate future traffic growth throughout the UK.

Traffic flows from Phase 1 of the development (reference: 19/00310/FUL) were included in the DM and DS scenarios in order to take account of cumulative air quality impacts as a result of both schemes.

Traffic flows from the development were provided by Curtins. These were added to the relevant links to produce the DS scenario.

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

Table A1.1 Traffic Data

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		
		2019	2025 DM	2025 DS	2019	2025 DM	2025 DS
L1	A58, Manchester Road, Eastbound (EB), Intersection with A664/B6452, SP	15,926	17,520	17,536	2.98	2.91	2.90
L2	A58, Manchester Road, EB, east of A664 Edinburgh Way, SP	17,889	19,255	19,270	3.71	3.67	3.67
L3	A58, Manchester Road, EB, west of Kemp Avenue	17,889	19,255	19,270	3.71	3.67	3.67

¹⁸ 3272r1 - Air Quality Assessment - Sandbrook Park, Rochdale, Redmore Environmental Ltd, 2019.

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		
		2019	2025 DM	2025 DS	2019	2025 DM	2025 DS
L4	A58, Manchester Road, EB, east of Kemp Avenue	17,889	19,255	19,270	3.71	3.67	3.67
L5	A58, Manchester Road, WB, east of Kemp Avenue	18,933	20,366	20,382	3.22	3.19	3.18
L6	A58, Manchester Road, WB, west of Kemp Avenue	18,933	20,366	20,382	3.22	3.19	3.18
L7	A58, Manchester Road, WB, east of A664 Edinburgh Way, SP	18,933	20,341	20,341	3.22	3.19	3.19
L8	A58, Manchester Road, WB, Intersection with A664/B6452, SP	14,973	16,209	16,209	3.35	3.30	3.30
L9	A58, Manchester Road, WB, west of A664 Edinburgh Way, SP	14,973	16,209	16,209	3.35	3.30	3.30
L10	A58, Manchester Road, WB, north of A58, Bolton Road	14,973	16,585	16,600	3.35	3.24	3.24
L11	A58, Manchester Road, EB, north of A58, Bolton Road	15,926	17,599	17,615	2.98	2.90	2.90
L12	B6452, Roch Valley Way, south of Roch Mills Crescent	9,997	10,790	10,790	2.35	2.32	2.32
L13	B6452, Roch Valley Way, SB Slip onto A58, Manchester Road, SP	9,997	10,632	10,632	2.35	2.35	2.35
L14	B6452, Roch Valley Way, SB, north of A58, Manchester Road, SP	9,997	10,711	10,711	2.35	2.34	2.34
L15	B6452, Roch Valley Way, NB, north of A58, Manchester Road, SP	9,997	10,711	10,711	2.35	2.34	2.34
L16	A664, Manchester Road, EB, Slip from A58, Manchester Road, SP	5,732	6,121	6,136	2.70	2.69	2.68
L17	A664, Manchester Road, EB, south of A58, Manchester Road	5,732	6,473	6,488	2.70	2.59	2.58
L18	A664, Manchester Road, WB, south of A58, Manchester Road	13,148	14,007	14,022	2.70	2.70	2.69
L19	A664, Manchester Road, WB, Slip to A58, Manchester Road, SP	13,148	14,359	14,374	2.70	2.65	2.65
L20	A664, Manchester Road, WB, Intersection with A58, SP	13,148	14,007	14,022	2.70	2.70	2.69

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		
		2019	2025 DM	2025 DS	2019	2025 DM	2025 DS
L21	A664, Manchester Road, EB, Intersection with A58, SP	5,732	6,473	6,488	2.70	2.59	2.58
L22	A664, Manchester Road, EB, west of A627(M)	11,464	12,593	12,625	2.70	2.61	2.61
L23	A664, Manchester Road, EB, Intersection with A627(M)	11,464	12,593	12,625	2.70	2.64	2.63
L24	A664, Manchester Road, EB, east of A627 (M)	16,657	17,872	17,900	3.70	3.67	3.67
L25	A664, Manchester Road, EB, east of A627(M), SP	16,657	17,872	17,900	3.70	3.67	3.67
L26	A664, Manchester Road, WB, east of A627(M), SP	18,240	19,550	19,575	3.70	3.68	3.67
L27	A664, Manchester Road, WB, east of A627(M)	18,240	19,550	19,575	3.70	3.68	3.67
L28	A664, Manchester Road, WB, east of A627(M), SP	18,240	19,550	19,575	3.70	3.68	3.67
L29	A664, Manchester Road, WB, Intersection with A627(M)	18,240	19,550	19,575	3.70	3.68	3.67
L30	A664, Manchester Road, WB, Intersection with A627(M) WB Slip	26,296	28,126	28,156	2.70	2.69	2.69
L31	A664, Manchester Road, EB, west of A627(M)	26,296	28,365	28,395	2.70	2.67	2.67
L32	A664, Queensway, EB, east of A664, Manchester Road, SP	10,476	11,277	11,291	3.00	2.97	2.97
L33	A664, Queensway, EB, east of A664, Manchester Road	10,476	11,277	11,291	3.00	2.97	2.97
L34	A664, Queensway, WB, east of A664, Manchester Road	11,228	12,074	12,087	3.48	3.45	3.45
L35	A664, Queensway, WB, east of A664, Manchester Road, SP	11,228	12,074	12,087	3.48	3.45	3.45
L36	A664, Queensway, WB, west of A664, Manchester Road	6,446	6,878	6,892	2.51	2.51	2.50
L37	A664, Queensway, west of A664, Manchester Road	12,076	12,885	12,919	2.65	2.64	2.63

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)		
		2019	2025 DM	2025 DS	2019	2025 DM	2025 DS
L38	A664, Queensway, EB, west of A664, Manchester Road	5,630	6,008	6,020	2.81	2.80	2.79
L39	A627(M), NB	29,259	31,403	31,433	4.80	4.76	4.76
L40	A627(M), NB Slip to A58, Manchester Road, SP	14,630	15,797	15,797	4.80	4.74	4.74
L41	A627(M), NB, SP	14,630	15,606	15,636	4.80	4.79	4.78
L42	A627(M), SB, SP	7,085	7,821	7,850	4.80	4.65	4.63
L43	A627(M), SB Slip to A58, Manchester Road, SP	7,085	7,535	7,535	4.80	4.80	4.80
L44	A627(M), SB	14,171	15,356	15,385	4.80	4.72	4.71
L45	A627(M), NB, Intersection with A58, Manchester Road, SP	14,630	15,606	15,636	4.80	4.79	4.78
L46	A627(M), SB, Intersection with A58, Manchester Road, SP	7,085	7,821	7,850	4.80	4.65	4.63
L47	Sandbrook Way	13,433	14,285	14,285	0.66	0.66	0.66
L48	Sandbrook Way	13,433	14,563	14,737	0.66	0.65	0.64
L49	Sandbrook Way	13,433	14,563	14,737	0.66	0.65	0.64
R1	A664 Manchester Road/A664 Queensway Roundabout	11,387	12,328	12,328	3.20	3.34	3.34
R2	Sandbrook Way Roundabout 1	6,717	7,282	7,369	0.66	0.65	0.64
R3	Sandbrook Way Roundabout 2	6,717	7,282	7,369	0.66	0.65	0.64

Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards. These are summarised in Table A1.2.

Table A1.2 Road Parameters

Link		Road Width (m)	Average Vehicle Speed (km/h)
L1	A58, Manchester Road, Eastbound (EB), Intersection with A664/B6452, SP	11.3	30

Link		Road Width (m)	Average Vehicle Speed (km/h)
L2	A58, Manchester Road, EB, east of A664 Edinburgh Way, SP	11.5	30
L3	A58, Manchester Road, EB, west of Kemp Avenue	6.8	40
L4	A58, Manchester Road, EB, east of Kemp Avenue	6.9	55
L5	A58, Manchester Road, WB, east of Kemp Avenue	6.8	55
L6	A58, Manchester Road, WB, west of Kemp Avenue	7.2	40
L7	A58, Manchester Road, WB, east of A664 Edinburgh Way, SP	10.2	30
L8	A58, Manchester Road, WB, Intersection with A664/B6452, SP	6.4	30
L9	A58, Manchester Road, WB, west of A664 Edinburgh Way, SP	7.5	30
L10	A58, Manchester Road, WB, north of A58, Bolton Road	7.0	45
L11	A58, Manchester Road, EB, north of A58, Bolton Road	9.9	45
L12	B6452, Roch Valley Way, south of Roch Mills Crescent	11.2	40
L13	B6452, Roch Valley Way, SB Slip onto A58, Manchester Road, SP	5.8	30
L14	B6452, Roch Valley Way, SB, north of A58, Manchester Road, SP	12.4	30
L15	B6452, Roch Valley Way, NB, north of A58, Manchester Road, SP	5.1	30
L16	A664, Manchester Road, EB, Slip from A58, Manchester Road, SP	7.6	30
L17	A664, Manchester Road, EB, south of A58, Manchester Road	7.6	30
L18	A664, Manchester Road, WB, south of A58, Manchester Road	12.1	30
L19	A664, Manchester Road, WB, Slip to A58, Manchester Road, SP	7.8	30
L20	A664, Manchester Road, WB, Intersection with A58, SP	9.1	30
L21	A664, Manchester Road, EB, Intersection with A58, SP	8.2	30
L22	A664, Manchester Road, EB, west of A627(M)	7.5	55
L23	A664, Manchester Road, EB, Intersection with A627(M)	21.5	55
L24	A664, Manchester Road, EB, east of A627 (M)	11.1	50
L25	A664, Manchester Road, EB, east of A627(M), SP	7.3	35
L26	A664, Manchester Road, WB, east of A627(M), SP	7.4	35
L27	A664, Manchester Road, WB, east of A627(M)	8.7	60

Link		Road Width (m)	Average Vehicle Speed (km/h)
L28	A664, Manchester Road, WB, east of A627(M), SP	13.0	60
L29	A664, Manchester Road, WB, Intersection with A627(M)	8.6	55
L30	A664, Manchester Road, WB, Intersection with A627(M) WB Slip	7.0	55
L31	A664, Manchester Road, EB, west of A627(M)	7.3	55
L32	A664, Queensway, EB, east of A664, Manchester Road, SP	5.7	35
L33	A664, Queensway, EB, east of A664, Manchester Road	3.7	40
L34	A664, Queensway, WB, east of A664, Manchester Road	3.8	45
L35	A664, Queensway, WB, east of A664, Manchester Road, SP	6.1	35
L36	A664, Queensway, WB, west of A664, Manchester Road	4.0	45
L37	A664, Queensway, west of A664, Manchester Road	6.0	45
L38	A664, Queensway, EB, west of A664, Manchester Road	5.7	45
L39	A627(M), NB	7.3	95
L40	A627(M), NB Slip to A58, Manchester Road, SP	4.6	40
L41	A627(M), NB, SP	12.8	40
L42	A627(M), SB, SP	8.8	40
L43	A627(M), SB Slip to A58, Manchester Road, SP	8.4	40
L44	A627(M), SB	7.2	95
L45	A627(M), NB, Intersection with A58, Manchester Road, SP	8.7	55
L46	A627(M), SB, Intersection with A58, Manchester Road, SP	8.6	55
L47	Sandbrook Way	8.9	35
L48	Sandbrook Way	16.5	35
L49	Sandbrook Way	6.7	35
R1	A664 Manchester Road/A664 Queensway Roundabout	8.5	35
R2	Sandbrook Way Roundabout 1	8.2	25
R3	Sandbrook Way Roundabout 2	8.2	25

Reference should be made to Figure 11 for a graphical representation of the road link locations.

Emission Factors

Emission factors were calculated using the relevant traffic flows and the Emission Factor Toolkit (version 11.0). This has been produced by DEFRA and incorporates COPERT 5.3 vehicle emission factors and fleet information.

There is current uncertainty over NO₂ 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 28.8km south 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 the 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, open suburbia'.

A z_0 of 0.2m was used to describe the meteorological site. This 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 site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'mixed urban/industrial'.

Background Concentrations

An annual mean NO₂ background concentration of 17.52µg/m³, taken from the DEFRA mapping grid square containing the RO7ANO monitor, was used in the assessment. This value was chosen to represent concentrations throughout the dispersion modelling extents without the contribution from road vehicles as it is higher than the DEFRA background for the grid square containing the site, as shown in Table 12. Values for PM₁₀ and PM_{2.5} from this grid square were used to provide continuity within the assessment.

Similarly to emission factors, background concentrations from 2019 were utilised throughout the assessment 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 NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance¹⁹.

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;

¹⁹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

- 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'²⁰, 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."

Monitoring of NO₂ concentrations was undertaken at three locations within the vicinity of roads included within the model during 2019. The results were obtained and the road contribution to total NO_x concentrations calculated following the methodology contained within DEFRA guidance²¹. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.3.

Table A1.3 Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
RO7ANO	7	32.1	28.70
RO8ANO	8	44.7	56.73
RO9ANO	9	39.6	44.99

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 A1.4.

²⁰ Use of 2020 and 2021 Monitoring Datasets, IAQM, 2021.

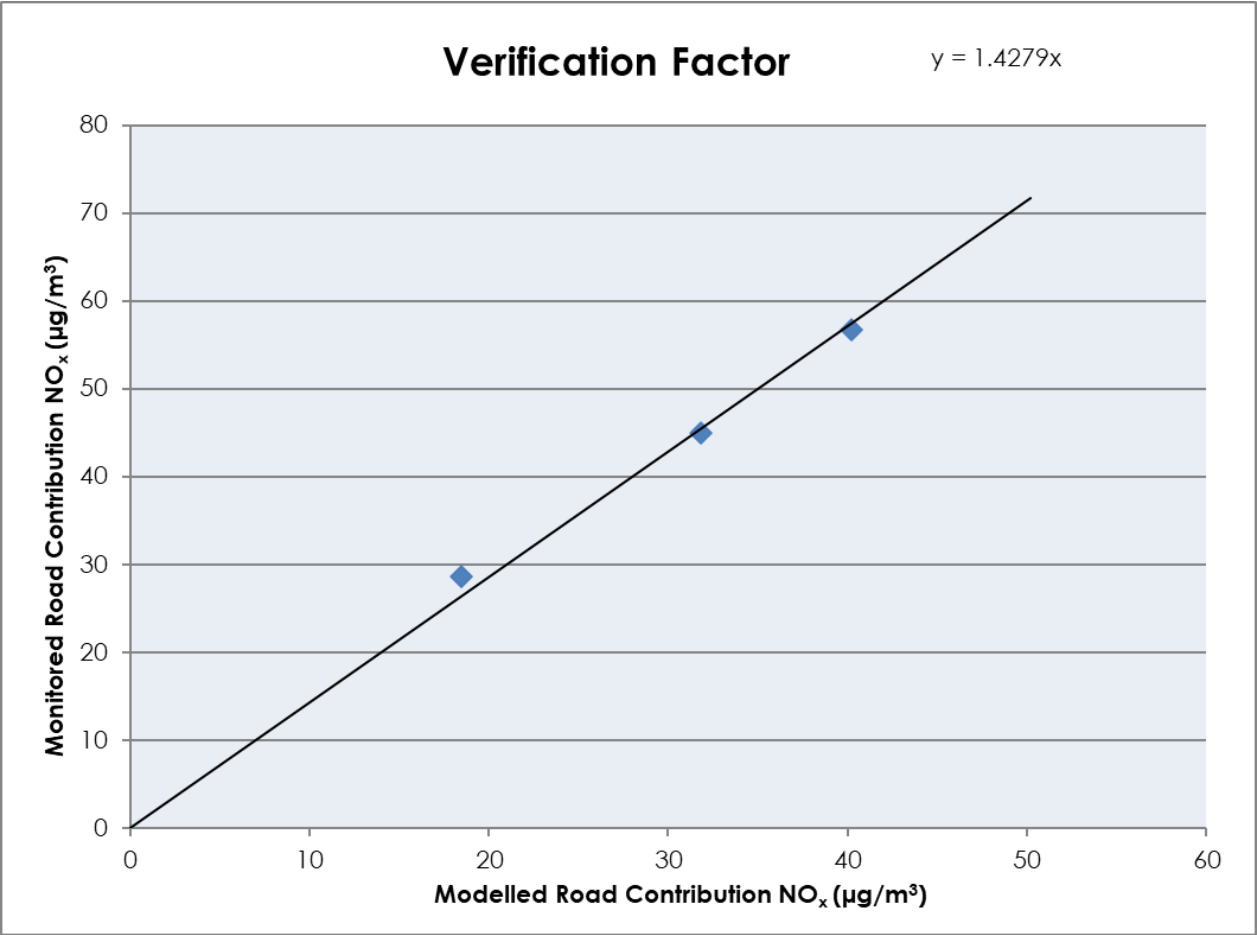
²¹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table A1.4 Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
RO7ANO	7	28.70	18.48
RO8ANO	8	56.73	40.21
RO9ANO	9	44.99	31.84

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.4279 was required to be applied to all monitoring results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



Monitoring of PM₁₀ and PM_{2.5} concentrations is 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 guidance²².

²² Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vitae

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.

KEY EXPERIENCE:

Olly is a Senior Environmental Consultant with specialist experience in the air quality sector. His key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- 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 (EIAs) and scoping reports for developments throughout the UK.
- Advanced canyon modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Assessment of fugitive dust impacts from a range of development sizes and mineral extraction sites.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.
- Organisation and delivery of bespoke monitoring programmes for a range of projects.

SELECT PROJECTS SUMMARY:

Medlock Street, Manchester

Air Quality Environmental Impact Assessment in support of the development of 1,014 purpose-built student accommodation units. Detailed dispersion modelling was undertaken in order to assess the potential for exposure of future occupants to any existing issues at the site, as well as air quality impacts associated with vehicles travelling to and from the scheme during operation. Modelling included complex road geometries, as well as advanced canyon inputs. The results indicated air quality conditions did not present an issue to planning consent.

Anstey Lane, Leicester

Odour Assessment in support of a residential-led development on land off Anstey Lane, Leicester. The proposals were located in close proximity to a number of eating and drinking establishments. As such, the Local Authority raised concerns that odour emissions may cause loss of amenity to future residents. A programme of Field Odour Surveys was undertaken to assess odour impacts from said premises. Results indicated odour effects at the site did not represent a constraint to planning consent.

Whitings Road, Barnet

Air Quality Neutral Assessment in support of a residential development comprising 35 units to determine compliance with the London Plan. Detailed consultation was undertaken with the Local Authority to ensure they were satisfied with the proposed measures aimed at reducing road vehicle exhaust emissions associated with the scheme. Following discussions and implementation of the identified strategies, compliance with the London Plan was achieved.

Honeycombe Beach, Bournemouth

Air Quality Assessment to determine air quality conditions within a covered car park serving a residential complex and evaluate the effectiveness of the existing ventilation system. Monitoring of pollutant concentrations over a three-month period at four locations at the site was undertaken. Internal concentrations of pollutants were below the relevant Work Exposure Limits (WELs) at all locations. As such, natural ventilation was considered to provide adequate control of internal air quality.

Brill Place, Camden

Organisation and delivery of a bespoke ambient monitoring programme to address a planning condition. The project included identification of appropriate monitoring equipment, agreement of the technical specifications and sampling positions with the Local Authority, as well as delivery of a text alert system to notify residents of exceedences of the relevant trigger levels and appropriate action to be taken to reduce exposure.

Matching Airport, Abbess Roding

Air Quality Assessment in support of a flexible generation facility. Dispersion modelling was undertaken to determine potential changes in pollution levels as a result of emissions from the installation and consider potential impacts at nearby sensitive receptor locations. Predicted concentrations of NO₂ were below the relevant air quality criteria at all locations of relevant exposure across all meteorological data sets modelled. The overall effects of the development were predicted to be not significant.

KEY EXPERIENCE:

Alec is a Graduate Environmental Consultant with specialist experience in the air quality sector. His key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality
- Advanced Canyon Modelling to evaluate the impact of altered urban topography on air quality in built up areas
- Assessment of construction dust impacts from a range of development sizes
- Assessment of fugitive dust impacts from a range of mineral extraction developments
- Assessment of petrol stations to address benzene concentrations and their impact on adjacent developments
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use

SELECT PROJECTS SUMMARY:

1 Piccadilly Circus, London

Air Quality Assessment in support of a tourist hostel located within an Air Quality Management Area (AQMA). The development had the potential to expose future occupants to elevated pollution levels and cause impacts at sensitive locations. Potential emissions from the proposals were also assessed to determine compliance with the Air Quality Neutral requirements of the London Plan. Results of the assessment indicated that the site was Air Quality Neutral and air quality factors were not a constraint to the development.

Kingscroft Farm, Havant

Air Quality Assessment in support of a residential development located in close proximity to the A27 and a number of gas-fired generator sites. The development had the potential to expose future residents to elevated pollution concentrations and cause impacts at sensitive locations. Detailed dispersion modelling was undertaken using ADMS-roads to assess pollutant concentrations across the development and a comparison was made between overall concentrations with and without the development in place. Results indicated pollutant concentrations were below the relevant standards across the site and impacts associated with the development were not significant.

Trademark House, Petersfield

Odour Assessment in support of a mixed-use development at Trademark House, Petersfield. The site was located in close proximity to a petrol filling station (PFS) and associated retail unit, which may result in loss of amenity at the development site. A two stage

Odour Assessment was undertaken to assess baseline conditions across the site and consider the risk of reduced amenity. Results of the assessment indicated odour effect at the site did not represent a constraint to planning consent. An Air Quality Benzene Assessment was also undertaken to determine potential exposure of future occupants to elevated benzene concentrations associated with the PFS. Results indicated that exceedences of the Air Quality Objective (AQO) were not predicted at the development location.

Granby Road, Buxton

Air Quality Assessment in support of a residential development on land off Granby Road, Buxton. Results of detailed dispersion modelling utilising advanced canyons indicated air quality impacts associated with the development were not significant. The scheme was also located in close proximity to Ashwood Dale Quarry. Potential impacts on future residential amenity were assessed using the Source-Pathway-Receptor approach, which indicated that existing emissions associated with the operation of the quarry were not considered significant.

Princess Road, Urmston

Odour Assessment in support of a residential development on Prince Road, Urmston. The site was located in close proximity to several fast-food takeaways which have the potential to cause odour emissions during normal operation. A mitigation scheme was therefore identified to protect future residents from loss of amenity. Subject to the inclusion of the specified mitigation overall effects of odour were considered to be not significant at the development.