

Prestwich Village

Air Quality Assessment

The Prestwich Regeneration LLP

Job No: 1039026
Doc Ref: 1039026-CDL-XX-XX-RP-AQ-40201
Revision: P07
Revision Date: 17 January 2024

Project title	Prestwich Village	Job Number
Report title	Air Quality Assessment	1039026

Document Revision History

Revision Ref	Issue Date	Purpose of issue / description of revision
P01	03 November 2023	Issue for comments
P02	17 November 2023	Updated to address comments
P03	08 December 2023	Updated to address comments and design changes
P04	11 December 2023	Updated to address comments
P05	11 January 2024	Updated to include re-assessment with revised traffic data
P06	16 January 2024	Updated with latest drawings and development description
P07	17 January 2024	Updated with revised roof plan drawing

Document Validation (latest issue)

17/01/2024	17/01/2024	17/01/2024
X	X	X
Principal author	Checked by	Verified by
Signed by: Annie Trevis	Signed by: Carrington, Jenny	Signed by: Carrington, Jenny

© Cundall Johnston & Partners LLP (“Cundall”) owns the copyright in this report and it has been written for the sole and confidential use of Muse. It must not be reproduced whole or in part without the express written authorisation of Cundall Johnston & Partners LLP. Parties other than those specifically named in this disclaimer must not rely upon this report. Any third party relying on this report does so at their own risk. Cundall accepts no duty or responsibility (including in negligence) to any such third party.

Executive Summary

This Air Quality Assessment has been prepared by Cundall on behalf of The Prestwich Regeneration LLP, a Joint Venture ('JV') between Bury Council and Muse Places and is submitted in support of an application for hybrid planning permission at "Prestwich Village".

In setting the scope of assessment, consideration has been made of the potential for impacts to occur during both the construction and operation phases, and the exposure of existing receptors and future occupants of the Site to air pollution.

The Site is located adjacent to the Bury Air Quality Management Area (AQMA) which covers large portions of the main roads within the borough, including the A56 which borders the Proposed Development. Bury Council declared the AQMA in 2002 for exceedances of the annual mean NO₂ objective and 24-hour mean PM₁₀ objective. It was amended in 2007 to only include annual mean NO₂. Recent Bury Council monitoring data from nearby sites indicates that there is unlikely potential for nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) concentrations at the Site to exceed the National Air Quality Objective threshold levels.

A construction dust impact assessment was undertaken in accordance with Institute of Air Quality Management (IAQM) guidance. It was concluded that in the absence of any adequate mitigation, there is a high risk from the demolition, earthworks, construction and trackout dust-generating activities associated with the Proposed Development. However, with appropriate mitigation measures implemented, it is anticipated that the dust generation and harmful emissions from construction site activities will not be significant. An Air Quality and Dust Management Plan (AQDMP) (forming part of a Construction Environmental Management Plan (CEMP)/Construction Logistics Plan) which conforms to the requirements of Bury Council will need to be provided prior to the commencement of any on-site works to ensure that the mitigation measures recommended are implemented throughout the construction phase. This can be secured by a suitably worded planning condition.

The Client will commit to the implementation of the best practice mitigation measures identified in this report during the construction phase of the development. It is anticipated that the generation of dust and harmful pollutants emissions from construction site activities will be reduced with the correct implementation of these measures.

Heating, cooling and hot water will be provided by air source heat pumps powered by electricity. If there is a requirement for any back-up/standby diesel generators, it is assumed that these units will be operational for less than 50 hours per year. Should any generators be required, the location of their flues would need be considered with respect to the air handling unit air intakes and any openable windows or amenity spaces, with the aim of achieving a distance of at least 10 m horizontal separation, where feasible. Based on these conditions, the emissions from this source are not anticipated to be significant.

The exposure of existing receptors and future occupants of the Proposed Development has been quantitatively assessed, with the following results:

- Exceedance of the national annual mean nitrogen dioxide (NO₂) objective is unlikely at all modelled receptor locations.
- Since all modelled NO₂ values are well below 60 µg/m³, exceedance of national short-term NO₂ objectives is unlikely at all modelled receptor locations.
- Exceedance of national annual mean and short-term mean particulate matter (PM₁₀) objectives is unlikely at all modelled receptor locations.
- Exceedance of the national annual mean fine particulate matter (PM_{2.5}) objective is unlikely at all modelled receptor locations.
- The predicted concentrations at receptors closest to the proposed Travel Hub (gardens of residents along Highfield Road and Highfield Place) did not exceed the air quality objectives for NO₂, PM₁₀, or PM_{2.5}.
- The impact of the Proposed Development on the AQMA adjacent to the Proposed Development is anticipated to

be negligible.

It is anticipated that the impact of the operation phase on existing receptors and future site users is likely to be negligible, and therefore no mitigation measures are required. However, consideration should be made for integrating particulate filters into the intakes of the air handling units where this is practicable, to help strive towards achieving the more stringent WHO guideline values. Under these conditions, it is anticipated that the exposure of future occupants to poor air quality will be unlikely, and no additional mitigation measures will be required.

Overall, it was concluded that with the provision of appropriate mitigation measures, construction activities and operation impacts will have no significant effects on local air quality. It can therefore be concluded that there are no air quality constraints to the construction and operation of the Proposed Development.

Contents

1.0	Introduction	2	8.0	Residual Effects	51
1.1	Site Location	2	8.1	Construction	51
1.2	Proposed Development	3	8.2	Operation	51
1.3	Scope of Assessment	8	9.0	Conclusion	53
2.0	Legislation, Policy and Guidance	10	10.0	References	55
2.1	Key Legislation and Policy	10	11.0	Glossary	59
2.2	Consultation with Bury Council	13	Annex A – Air Quality Assessment Authors	62	
2.3	Planning Policy and Guidance	13	Annex B – Consultation with Bury Council	63	
3.0	Approach and Methodology	19	Annex C – IAQM Construction Assessment Methodology	70	
3.1	Overall Approach	19	Annex D – EPUK/IAQM Local Air Quality Assessment Screening Criteria	75	
3.2	Existing Conditions	19	Annex E – Results of Screening Assessment	78	
3.3	Construction Phase	19	Annex F – Model Input Data	79	
3.4	Operation Phase	20	Annex G – Model Verification	84	
4.0	Site Description and Baseline Conditions	28	Annex H – Dispersion Modelling Results	87	
4.1	Local Air Quality Management	28	Annex I – Mitigation Measures for Construction	91	
4.2	Defra's Background Pollutant Concentration Mapping	36			
4.3	Local Transport Sources of Pollution	36			
4.4	Local Industrial Sources of Pollution	37			
4.5	Sensitive Receptors	38			
5.0	Impact Evaluation	41			
5.1	Construction Phase Impacts	41			
5.2	Operation Phase	45			
6.0	Assumptions and Limitations	47			
6.1	Dispersion Modelling - General	47			
6.2	Model Verification	47			
6.3	Background Concentrations and Traffic Emissions	47			
6.4	Construction Phase	47			
7.0	Mitigation	49			
7.1	Construction	49			
7.2	Operation	49			

Figures

Figure 1-1: Location of the Application Site (Courtesy of Google Maps)	2
Figure 1-2: Aerial Image (Courtesy of Google Satellite)	3
Figure 1-3: Proposed Ground Floor Site Plan (Courtesy of John Matthews Architects)	5
Figure 1-4: Proposed First Floor Site Plan (Courtesy of John Matthews Architects)	6
Figure 1-5: Proposed Roof Site Plan (Courtesy of John Matthews Architects)	7
Figure 3-1: Wind Rose for Manchester Airport	23
Figure 3-2: Modelled Receptors	25
Figure 4-1: Air Quality Management Area (AQMA)	29
Figure 4-2: Automatic Monitoring Sites	30
Figure 4-3: Local Diffusion Tube Sites	32
Figure 4-4: Local Diffusion Tubes Sites - A56	33
Figure 4-5: Part A Sites	37
Figure 4-6: Sensitive Receptors	38
Figure 4-7: Sensitive Ecological Sites	39
Figure 5-1: Construction Dust Buffer Zones (courtesy of Google Satellite)	42
Figure 5-2: Trackout Buffer Zones (courtesy of Google Satellite)	43
Figure F--1: Modelled Roads	79
Figure F-2 Modelled Car Parks – Existing	82
Figure F-3: Modelled Car Parks – Proposed	83

Tables

Table 2-1: Key Legislation	11
Table 2-2: UK Air Quality Objectives (AQO) and future targets from EIP23	12
Table 2-3: Comparison of WHO Guidelines with National Air Quality Objectives	13
Table 2-4: Key Policy and Guidance	17
Table 3-1: Modelled Receptors	24
Table 4-1: Details of Automatic Monitoring Sites within 2km	29
Table 4-2: Results of Local Air Quality Monitoring at Automatic Sites - NO ₂	31

Table 4-3: Results of Local Air Quality Monitoring at Automatic Sites - PM ₁₀	31
Table 4-4: Details of Diffusion Tube Monitoring Sites within 2km	34
Table 4-5: Diffusion Tube Monitoring Results 2017 to 2022	35
Table 4-6: Defra's 2022 and 2030 background concentrations of NO _x , NO ₂ , PM ₁₀ and PM _{2.5}	36
Table 5-1: Determination of the potential dust emission magnitude	41
Table 5-2: Sensitivity of the Area Summary	44
Table 5-3: Risk of Impacts	44
Table 7-1: Comparison of WHO Guidelines with National Air Quality Objectives	49
Table 11-1: Glossary	60
Table C-1: Potential Dust Emission Magnitude Criteria	
Table C-2: Sensitivities of People to Dust Soiling Effects, Health Effects of PM ₁₀ , and Sensitivities of Receptors to Ecological Effects	
Table C-3: Sensitivity of the Area to Dust Soiling Effects on People and Property	
Table C-4: Sensitivity of the Area to Human-Health Impacts	
Table C-5: Sensitivity of the Area to Ecological Impact	
Table C-6: Risk of Impact – Demolition	
Table C-7: Risk of Impact – Earthworks	
Table C-8: Risk of Impact – Construction	
Table C-9: Risk of Impact – Trackout	
Table D-1: Stage 1 Criteria	76
Table D-2: Indicative Criteria for Requiring an Air Quality Assessment	76
Table D-3: Indicative Criteria for Requiring an Air Quality Assessment	77
Table E-1: Indicative Criteria for Requiring a Detailed Air Quality Assessment	78
Table F-1: Modelled Traffic Data	80
Table F-2: Car park emissions calculations input data	81
Table F-3: Car park model input data	81

Table G-1: Model Performance Prior To Bias Adjustment	85
Table G-2: Model Performance After Adjustment	86
Table H-1: NO ₂ Annual Mean Concentrations at Modelled Receptors During the Operation Phase	88
Table H-2: PM ₁₀ Annual Mean Concentrations at Modelled Receptors During the Operation Phase	89
Table H-3: PM _{2.5} Annual Mean Concentrations at Modelled Receptors During the Operation Phase	90
Table I-1: Construction Mitigation Measures - Site Management	91
Table I-2: Construction Mitigation Measures - Preparing and Maintaining the Site	91
Table I-3: Construction Mitigation Measures - Operating Vehicle/Machinery and Sustainable Travel	92
Table I-4: Construction Mitigation Measures - Operations	92
Table I-5: Construction Mitigation Measures - Waste Management Activities	92
Table I-6: Construction Mitigation Measures - Demolition Activities	92
Table I-7: Construction Mitigation Measures - Earthworks Activities	92
Table I-8: Construction Mitigation Measures - Construction Activities	93
Table I-9: Construction Mitigation Measures - Trackout Activities	93

1.0

Introduction

1.0 Introduction

This Air Quality Assessment has been prepared by Cundall on behalf of The Prestwich Regeneration LLP, a Joint Venture ('JV') between Bury Council and Muse Places and is submitted in support of an application for hybrid planning permission at "Prestwich Village".

The Proposed Development is located adjacent to the Bury Air Quality Management Area (AQMA), specifically the sections associated with the A56 which borders the Proposed Development.

1.1 Site Location

The Site is situated at Bury New Road, Prestwich, Manchester, M25 1AY.

The application site as existing is circa. 2.48 hectares and comprises a mixture of surface level car parking bound by Rectory Lane to the south and east and existing buildings including; the Longfield Centre, Prestwich Library and Prestwich Health Centre. The application site also incorporates an existing surface level car park north of Fairfax Road.

The site is irregular in shape and bound by Rectory Lane to the east and south; existing retail units and Bury New Road to the west; with retail units and residential dwellings, including The Radius building to the north. In addition, the Prestwich Metrolink stop is located adjacent to the site's eastern boundary.

The location of the application site is illustrated in Figure 1-1. Additional context is provided by the aerial image (Figure 1-2).

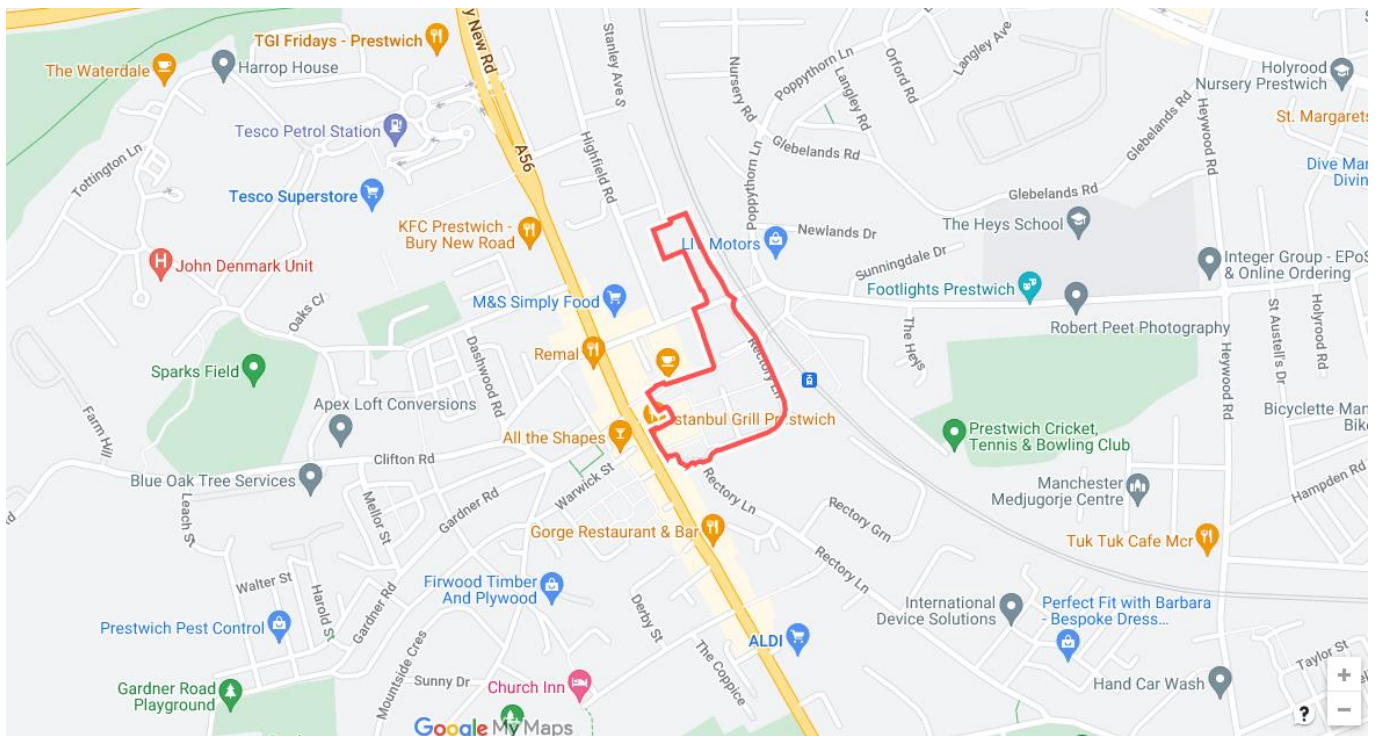


Figure 1-1: Location of the Application Site (Courtesy of Google Maps)



Figure 1-2: Aerial Image (Courtesy of Google Satellite)

1.2 Proposed Development

The Proposed Development description is as follows:

"Hybrid application comprising: Full planning application proposing demolition of existing buildings and structures and the erection of a phased mixed use development including a Community Hub comprising flexible uses including library, offices, medical or health services (Use Classes F1 (a-f), F2(b), E(c), E(e), E(g)) and retail uses (Use Classes E(a), E(b) F2(a)) and Sui Generis (hot food takeaway and bar), a new Market Hall (Use Classes E(a), E(b) and Sui Generis (hot food takeaway and bar)), a Commercial Building comprising flexible uses including retail, offices, gymnasium (Use Classes E(a), E(b), E(c), E(d), E(g), F2(a), a Travel Hub comprising car parking and cycle parking (Sui Generis), a public square and public realm and associated landscaping, car parking provision, cycle storage and other associated works; and part Outline planning application (with all matters reserved) proposing a phased residential led mixed use development comprising residential (Use Class C3), flexible commercial, business, service, local community and learning uses (Use Classes E, F) and Sui Generis (hot food takeaway and bar), engineering works to Rectory Lane, new public realm, associated landscaping, car parking provision, cycle storage and other associated works".

The site is to be delivered in two principal phases:

- Phase 1: Full Application Area (circa. 1.42 ha)
- Phase 2: Outline Application Area (circa. 1.06 ha)

Proposals are for the redevelopment of the Longfield Centre and surrounding area, for the construction of mixed-use buildings, including residential, office and retail properties. The design requires the demolition of some of the existing on-site buildings. The wider redevelopment proposals comprise:

- Plot A Community hub including library, office / health facilities, with retail / commercial space at ground floor level, delivered to 'Shell & Core'
- Plot B Retail Hub including gym / fitness suite, with retail / commercial space at ground floor level, delivered to 'Shell & Core'
- Plot C Market Hall including retail, fresh food, and food & beverage stalls delivered to shell only specification

- Plot D residential
- Plot E residential
- Plot F residential
- Plot G Travel Hub

The proposed ground floor site plan¹ has been reproduced as Figure 1-3, courtesy of John Matthews Architects. The proposed first floor site plan² and roof site plan³ have been reproduced as Figure 1-4 to Figure 1-5 courtesy of John Matthews Architects.

¹ John Matthews Architects (2024) Prestwich Village Masterplan, Ground floor, Proposed site plan, Ref: 207-JMA-MP-00-DR-A-001400, Rev: P00, 16.01.24

² John Matthews Architects (2024) Prestwich Village Masterplan, First floor, Proposed site plan, Ref: 207-JMA-MP-01-DR-A-001401, Rev: P00, 16.01.24

³ John Matthews Architects (2024) Prestwich Village Masterplan, Roof plan, Proposed site plan, Ref: 207-JMA-MP-RF-DR-A-001410, Rev: P00, 16.01.24

Figure 1-3: Proposed Ground Floor Site Plan (Courtesy of John Matthews Architects)

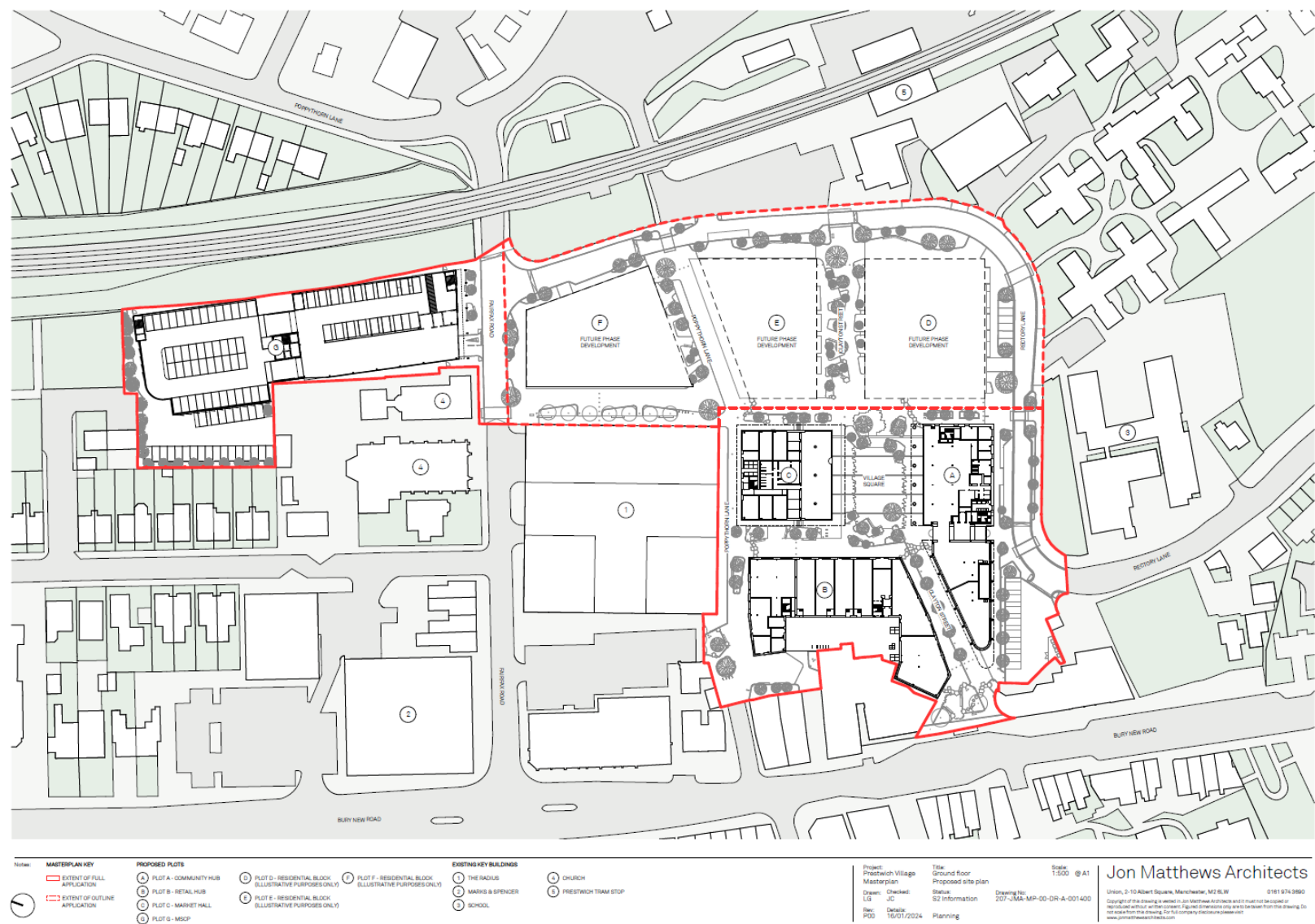


Figure 1-4: Proposed First Floor Site Plan (Courtesy of John Matthews Architects)

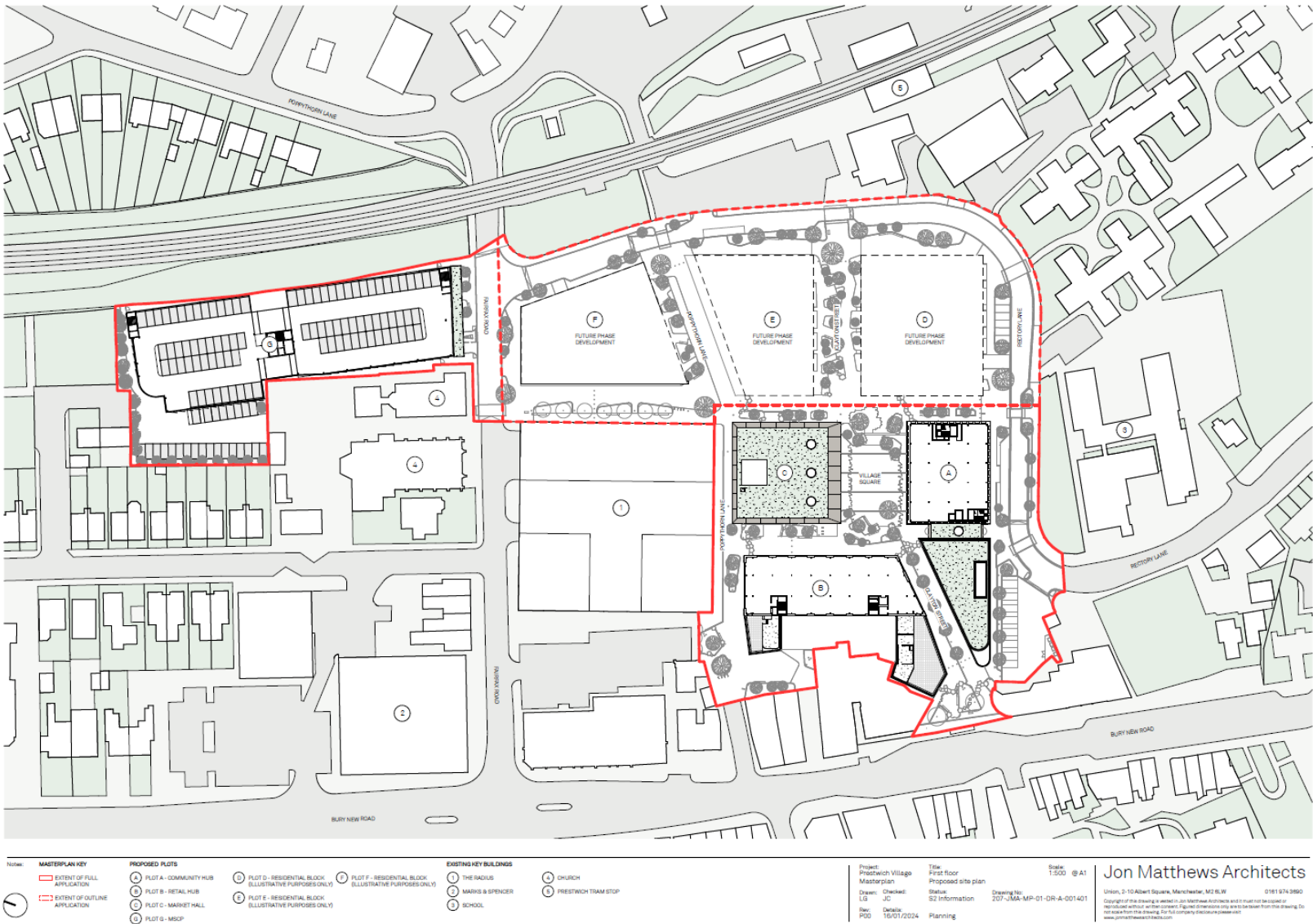
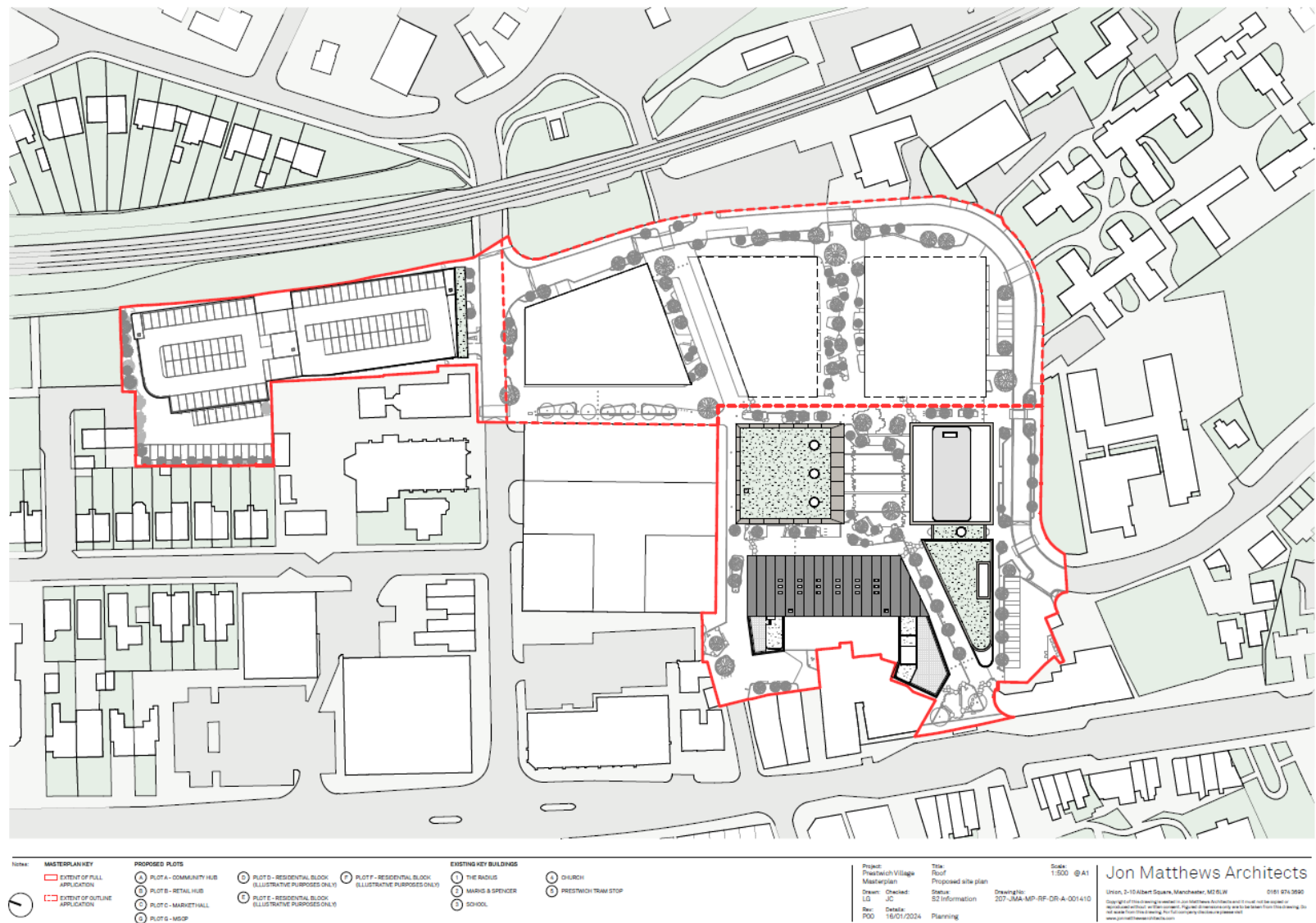


Figure 1-5: Proposed Roof Site Plan (Courtesy of John Matthews Architects)



1.3 Scope of Assessment

In setting the scope of assessment, consideration has been made of guidance provided within the Greater Manchester Air Quality Action Plan⁴, which states that the criteria that may trigger the need for air quality assessments (AQA) are set out by IAQM and EPUK guidance. The guidance states that an AQA will be required if any of the following apply:

- Development of dwellings where 10 or more dwellings are to be provided, or the site area is 0.5 hectares or more.
- Development of other uses, where the floor space is 1,000 square metres or more, or the site area is 1 hectare or more.

The Proposed Development site area is 2.48 hectares which triggers the requirement for a supporting air quality assessment. This document has therefore been prepared in support of the planning application and considers the potential for effects to occur during both the construction and operation phases of the development.

This air quality assessment outlines the relevant air quality legislation and policy guidance and presents the assessment methodology. The main pollutants of concern for this assessment are oxides of nitrogen (NO_x), including nitrogen dioxide (NO₂), fine and very fine particulate matter (PM₁₀ and PM_{2.5}). The existing air quality conditions are presented and the likely air quality impacts from construction and operation of the Proposed Development are considered. The effects are assessed in the context of relevant national, regional and local air quality legislation, policies and guidance. Mitigation measures are proposed, as required, to reduce the effect of the Proposed Development to negligible, as far as reasonably practicable. The scope of the assessment is detailed further in Section 3.0.

This assessment has been undertaken by Cundall's Air Quality Team, who are all Members or Associate Members of the Institute of Air Quality Management (IAQM) and managed by a team member who is professionally chartered. Full details are provided in Annex A.

⁴ Greater Manchester Combined Authority/ Transport for Greater Manchester, Greater Manchester Air Quality Action Plan 2016-2021, https://www.manchester.gov.uk/downloads/download/4166/air_quality_reports

2.0

Legislation, Policy and Guidance

2.0 Legislation, Policy and Guidance

2.1 Key Legislation and Policy

This assessment considers key air quality legislation, which is summarised in Table 2-1.

Legislation	Description
EU Ambient Air Quality Directive 2008/50/EC ⁵	Establishes the requirements of Member States in terms of improvements required to air quality. Sets standards for a variety of pollutants for human-health and the environment.
The Air Quality Standards Regulations 2010 ⁶	Transposes formalised EU Limit Values set out in directive 2008/50/EC to UK law. An Amendment was published in 2016 ⁷
Clean Air Strategy 2019 ⁸	Defra published a Clean Air Strategy in January 2019, setting out a wide range of actions for UK Government to reduce pollutant emissions and improve air quality. The actions are grouped into four main emission sources: Transport, Domestic, Farming and Industry The Clean Air Strategy sets out the case for action and demonstrates the government's determination to improve air quality. In some cases, the goals are even more ambitious than EU requirements to reduce people's exposure to toxic pollutants like nitrogen oxides, ammonia, particulate matter, non-methane volatile organic compounds and sulphur dioxide.
Defra Air Quality Strategy (2023) ⁹	This guidance document provides a strategic framework for local authorities and other partners, setting out their powers, responsibilities and further actions they're expected to take. It sets out a framework to enable local authorities to contribute to long-term air quality goals, including the ambitious new targets for fine particulate matter (PM _{2.5}), detailed in the Environment Improvement Plan.
Environment Act 1995, Part IV ¹⁰ , amended by the Environment Act 2021.	Defines the requirements for Local Air Quality Management (LAQM).
Environment Protection Act 1990, amended by the Pollution Prevention and Control Act 1999 ¹¹ and the Environment Act 2021.	Part III provides statutory nuisance provisions for nuisance dust. Nuisance complaints about dust would need to be investigated by the Local Authority. In practice, dust deposition is generally managed appropriately by suitable on-site practices and mitigation, avoiding the determination of statutory nuisance and/or prosecution or enforcement notices.
The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 ¹²	Developers and contractors are required to meet compliance with the emission standards for Non-Road Mobile Machinery (NRMM). The Regulations exercise of the powers conferred by section 2(2) of, and paragraph 1A of Schedule 2 to, the European Communities Act 1972 in relation to the type, description, construction or equipment of vehicles.

⁵ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

⁶ HMSO (2010). Statutory Instrument 2010 No. 1001, The Air Quality Standards Regulations 2010, London: HMSO

⁷ HMSO (2016). Statutory Instrument 2016 No. 1184, Environmental Protection, England, The Air Quality Standards (Amendment) Regulations 2016, London: HMSO, <https://www.legislation.gov.uk/ukSI/2016/1184/contents/made>

⁸ Department for Environment Food and Rural Affairs (Defra) (2019) Clean Air Strategy 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

⁹ Defra (2023) Air Quality Strategy Framework for local authority delivery, 28 April 2023 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1180706/Air_Quality_Strategy_Web.pdf

¹⁰ Environment Act 1995, Chapter 25, Part IV Air Quality

¹¹ Environmental Protection Act 1990, Chapter 43, Part III Statutory Nuisances and Clean Air <https://www.legislation.gov.uk/ukpga/1990/43/part/III>

¹² HMSO (2018) The Non-Road Mobile Machinery Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018, UK Statutory Instruments, 2018 No. 764, <https://www.legislation.gov.uk/ukSI/2018/764/made>

Legislation	Description
Environment Act, 2021 ¹³ .	The Act makes provision about targets, plans and policies with the focus of improving the natural environment. This includes air quality, as well as water, nature and biodiversity, regulation of chemicals, waste and resource efficiency and recall of products failing to meet environmental standards. The Act introduces a duty on government to bring forward at least two air quality targets by October 2022 for consultation. These are to be to reduce the annual average level of fine particulate matter (PM_{2.5}) and to set a long-term (minimum of 15 year) target for its reduction. The 2021 Act amends the Environment Act 1995 Part IV by seeking to strength local air quality a management (LAQM) through greater cooperation at local level and broadening the range of organisations that play a role in improving air quality. Responsibility for tackling air pollution is to be shared between designated local authorities, all tiers of local government and neighbouring authorities. The environment secretary will be required to review the Air Quality Strategy at least every five years and publish annual progress reports to parliament. The 2021 Act amends the Clean Air Act 1993 to give local authorities more power to reduce pollution in smoke control areas by replacing the criminal offence of emitting smoke from a chimney in a smoke control area with a civil penalty regime, seeking to enable simpler, quicker and more proportionate enforcement at local level. It also amends the Environmental Protection Act 1990 by extending the system of statutory nuisance to private dwellings in smoke control areas, which could result in abatement notice and issuing fines for criminal offence of breaches. The 2021 Act introduces new powers for the government to compel vehicle manufacturers to recall vehicles and non-road machinery that fails to meet legal binding standards.
Environmental Improvement Plan, 2023 ¹⁴	The Environmental Improvement Plan (EIP23) highlights that air quality continues to be the biggest environmental risk to human health and a source of harm to the natural environment. The document makes provision about targets and plans with the focus of improving the environmental quality. This includes reducing emissions in the home, driving effective local action through local authorities, maintaining and improving regulatory framework for industrial emissions, supporting farmers to cut the impact of agriculture on air quality and reducing emissions from cars and other forms of transport. Ten environmental goals were set in the 25 Year Environmental Plan. The second goal is clean air and the EIP23 seeks to address this further through the following targets and commitments: ▪ In 2040 reduce population exposure of fine particulate matter (PM_{2.5}) by 35% compared to 2018 levels (with an interim target of a 22% reduction by January 2028) ▪ Work towards meeting compliance with a 40µg/m³ limit for nitrogen dioxide (NO₂) ▪ Maximum annual mean 10µg/m³ for PM_{2.5} (with an interim target of 12µg/m³ by January 2028) ▪ Legal emission reduction targets for five damaging pollutants by 2030 relative to 2005 levels: ○ Reduce emissions of nitrogen oxides by 73%. ○ Reduce emissions of sulphur dioxide by 88%. ○ Reduce emission of (PM_{2.5}) by 46%. ○ Reduce emissions of ammonia by 16%. ○ Reduce emissions of non-methane volatile organic compounds by 39%. Progress towards delivering the EIP23 will be monitored through Annual Progress Reports and the Outcome Indicator Framework. This framework contains 66 indicators, six which are relevant to clean air.

Table 2-1: Key Legislation

¹³ HMSO (2021) Environment Act 2021, November 2021, <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

¹⁴ HM Government (2023) Environmental Improvement Plan 2023, <https://www.gov.uk/government/publications/environmental-improvement-plan>

The UK Air Quality Objectives (AQOs)¹⁵ which apply to this assessment¹⁶ are shown in Table 2-2. Relevant Future Targets outlined in the Environmental Improvement Plan 2023 are also listed. Some pollutants have long-term (annual mean) objectives due to the chronic way they affect human health or the natural environment and others have short-term (1-hour, 24-hour mean) objectives due to the acute way they affect human health or the natural environment.

Pollutant	Averaging Period	Objective Threshold	Future Target (EIP23)
For the protection of human health			
Nitrogen Dioxide (NO ₂)	Annual mean	40 µg/m ³	-
	1-hour mean	200 µg/m ³ Not to be exceeded more than 18 times per year (equivalent to the 99.79 th percentile of 1-hour mean values)	-
Particulate Matter (PM ₁₀)	Annual mean	40 µg/m ³	-
	24-hour mean	50 µg/m ³ Not to be exceeded more than 35 times per year (equivalent to the 90.4 th percentile of 24-hour mean values)	-
Fine Particulate Matter (PM _{2.5})	Annual mean	20 µg/m ³	10 µg/m ³ by end of 2040 46% reduced by 2030 based on 2005 levels. 35% reduced by end of 2040 based on 2018 levels
For the protection of vegetation and ecosystems			
Nitrogen oxides (NO _x)	Annual mean	30 µg/m ³	73% reduced by 2030 based on 2005 levels

Table 2-2: UK Air Quality Objectives (AQO) and future targets from EIP23

Previous research carried out on behalf of Defra identified that exceedances of the NO₂ 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m³. This assumption is still considered valid; therefore, Defra's Technical Guidance document, LAQM (TG22)¹⁷ confirms that this figure can be referenced where 1-hour mean monitoring data are not available (typically if monitoring NO₂ using passive diffusion tubes).

Good practice design (e.g., Building Regulations) often consider WHO guidelines, which are usually more stringent (see Table 2-3). Compliance with WHO recommended guidelines for residential and non-residential elements is considered 'best practice' but is non-mandatory at present, i.e., suitable control can be adopted on an 'as-required' basis. The WHO recommended guidelines were updated in September 2021¹⁸. The update includes Air Quality Guideline (AQG) levels for the pollutants of relevance to this assessment (NO₂, PM₁₀ and PM_{2.5}) and a range of interim targets.

¹⁵ Department for Environment Food & Rural Affairs (Defra) UK Air Information Resource (UK AIR), National air quality objectives, https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

¹⁶ Other pollutants have been screened out of this assessment as exceedance of their respective objectives is not anticipated to be associated with the pollutant sources of relevance to this assessment.

¹⁷ Department for Environment Food & Rural Affairs (Defra) (2022) Local Air Quality Management Technical Guidance (TG22), August 2022 <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>

¹⁸ World Health Organisation (WHO) (2021) WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, <https://apps.who.int/iris/handle/10665/345329>.

Pollutant	Averaging Period	Air Quality Objective (AQO) ($\mu\text{g}/\text{m}^3$)	WHO Guidelines ($\mu\text{g}/\text{m}^3$)	
			Interim Target	AQG Level
NO ₂	Annual mean	40	40 to 20	10
PM ₁₀	Annual mean	40	70 to 20	15
PM _{2.5}	Annual mean	20	35 to 10	5

Table 2-3: Comparison of WHO Guidelines with National Air Quality Objectives

2.2 Consultation with Bury Council

Following an initial screening and scoping exercise, consultation with Bury Council's Environmental Health Team was undertaken on the 21st of July 2023 to discuss and agree the scope of the assessment. Further details are provided in Annex B.

2.3 Planning Policy and Guidance

Consideration of the strategic location and design of new developments is of key importance in the land-use planning process and can provide a means of improving air quality. Air quality considerations as part of development applications may become material in determining planning applications. Relevant planning policy and guidance at the National, Regional, and Local levels as summarised in Table 2-4.

Policy / Guidance	Description
National Policy and Guidance	
Ministry of Housing, Communities & Local Government – National Planning Policy Framework (NPPF) (2023) ¹⁹	The National Planning Policy (NPPF) published March 2012 and last updated in September 2023 with the purpose of planning achieving sustainable development. Paragraph 186 of the NPPF states that: <i>“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 AQMAs 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”.</i> In addition, paragraph 105 states that: <i>“The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.”</i> Paragraph 174 discusses how planning policies and decisions should contribute to and enhance the natural and local environment. Of relevance to air quality, NPPF notes that this can be achieved by: <i>“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, taking into account relevant information such as river basin management plans”</i>

¹⁹ Ministry of Housing, Communities & Local Government, National Planning Policy Framework, September 2023
<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Policy / Guidance	Description
Planning Policy Guidance (updated 2019) ²⁰	Planning Practice Guidance (PPG) documents have been published as part of the NPPF. PPG relating to air quality was last updated in November 2019. It provides guidance on the significance of air quality in determining the local impact of proposed developments and highlights the importance of local and neighbourhood plans with regard to air quality. A flowchart is provided to assist local authorities in determining how air quality considerations might fit into development management processes.
UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations. Detailed Plan. Defra / Department of Transport (DfT) (2017) ²¹	This plan was produced in response to a UK Supreme Court Ruling and sets out how the UK will achieve compliance with EU Limit Values for nitrogen dioxide (NO ₂) in the shortest possible time. The plan outlined infrastructure initiatives and grants and the requirements for Local Authorities to produce local action plans, with the aim of reducing NO ₂ concentrations below the objective as soon as practically possible.
Regional Planning Policies	
Greater Manchester's Clean Air Plan ²²	The 10 Greater Manchester local authorities (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford and Wigan), Greater Manchester Combined Authority (GMCA) and Transport for Greater Manchester (TfGM) are working together to develop a Clean Air Plan to tackle nitrogen dioxide (NO₂) exceedances at the roadside "in the shortest time possible" and by 2026 at the latest. The key aims are summarised as follows: ▪ Target funding towards the most polluting vehicles travelling in locations with nitrogen dioxide levels above the legal limit. ▪ Reduce emissions and bring health benefits as quickly as possible from every funded vehicle upgrade. ▪ Take into account the benefit of delivering the transformational Bee Network and investment in zero-emission bus fleets that wasn't available to Greater Manchester when it agreed the previous Clean Air Plan in summer 2021. In January 2023, more evidence was requested for the Plan by the government. Following submission of this evidence, the Plan will be opened for public consultation.
Greater Manchester Planning Guidance on Air Quality (2022) ²³	Greater Manchester Combined Authority (GMCA) have adopted the most recent IAQM guidance on the assessment and control of dust from demolition and construction sites, and also for air quality considerations in land-use planning and development control. Applicants, developers and consultants are advised to read the IAQM guidance prior to submitting a planning application.
Emerging Greater Manchester's Places for Everyone Plan	The emerging plan is being prepared on behalf of the 10 Greater Manchester local authorities and looks ahead to the period 2020 to 2037. The plan: • Sets out how Greater Manchester should develop up until 2037. • Identifies the amount of new development that will come forward across the 10 districts, in terms of housing, offices, and industry and warehousing, and the main areas in which this will be focused. • Supports the delivery of key infrastructure, such as transport and utilities. • Protects the important environmental assets across the city region. • Allocates sites for employment and housing outside of the existing urban area; and defines a new green belt boundary for Greater Manchester.
Greater Manchester Air Quality Action Plan 2016-2021 (AQAP)	The AQAP identifies a range of actions to reduce emissions and mitigate the impacts on air quality. Some Key actions regards development and transportation are: ▪ Actions for managing new development: ▪ Construction Management Guidance – where a key priority area is affected by a proposed scheme, a high level of mitigation control will be requested.

²⁰ Ministry of Housing, Communities and Local Government (2019) Planning Practice Guidance: Air Quality, updated 1 November 2019
<https://www.gov.uk/guidance/air-quality--3>

²¹ Department for Environment, Food and Rural Affairs / Department for Transport (2017) UK plan for tackling roadside nitrogen dioxide concentrations, July 2017 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633269/air-quality-plan-overview.pdf

²² Clean Air Greater Manchester, Greater Manchester Combined Authority (GMCA) reports, <https://cleanairgm.com/gmca-reports/>

²³ Manchester City Council (2022) Additional Planning Guidance, Environmental information for developers, August 2022
https://www.manchester.gov.uk/info/500207/planning_and_regeneration/1962/additional_planning_guidance/3

Policy / Guidance	Description
	- Development Planning Guidance - to ensure that potential local air quality effects are not overlooked and is not intended to introduce a burden on developers or local authorities to undertake unnecessary work. - Cumulative Development Database - A centralised database of significant planning applications and air quality assessments will be managed by Transport for Greater Manchester (TfGM), as a record of the cumulative effects of multiple developments and thereby facilitate combined approaches to minimising emissions. - Clean Air Zone – TfGM will undertake an appraisal of the effects of charging Clean Air Zones (CAZ) 20mph Zones - The implementation of 20mph zones in urban areas has been cited as having the potential to benefit local air quality through smoother vehicle flow through junctions and reduced acceleration and braking, as well as having potential for additional benefits from encouraging modal shift from driving to walking or cycling. - Encouraging Travel Planning - Individuals and companies are encouraged to look at travel planning measures, and to investigate the potential of additional demand management measures to affect a significant mode shift and to stimulate the uptake of low-emission vehicles. - Taxi and Private Hire Quality Controls to Priorities Low-Emission Vehicles Green Infrastructure - The provision of green infrastructure in and around urban areas is now widely recognised as contributing towards creating places where people want to live and work.
Greater Manchester Low-Emission Strategy (2016) ²⁴	The Low-Emission Strategy sets out a framework for policies and measures to: - Reduce air pollution as a contributor to ill-health in Greater Manchester - Support the UK government in meeting EU air quality thresholds. Contribute to a reduction in Greater Manchester's carbon footprint; and encourage low-emission behaviours in the culture and lifestyles of the city region.
Local Planning Policies	
Bury Unitary Development Plan (UDP) (1997) ²⁵	The plan acts as a guide for the future development or protection of land in the Borough. Its plans and proposals currently form the basis for the Council's decisions on planning applications. The UDP is set to be replaced by the Bury Local Plan. Policy EN7/1 – Atmospheric Pollution, states that: <i>"In seeking to limit atmospheric pollution the Council will not permit development which:</i> <i>would result in unacceptable levels of atmospheric pollution; and/or</i> <i>is not compatible with the achievement of the Council's long term air quality standards."</i> <i>"The Borough's air quality can be protected by restricting developments likely to cause atmospheric pollution problems. The Council's Environmental Principles Statement (approved by Council 1991), as part of its intention to reduce air pollution emissions, has made reference to developing and maintaining an "air pollution monitoring network". This policy will be implemented in liaison with the Council's Environmental Health Division which will not attempt to duplicate the work of other Pollution Control Authorities. The Council will also have regard to the proposed Greater Manchester Air Quality Strategy, which is to be produced following the requirements of the Environment Act 1995. This Act requires local authorities to assess and manage air quality."</i>
Bury Local Plan ²⁶	Bury Council is in the process of preparing a new Local Plan to guide future development in the borough. It will form part of Bury's overall development plan, alongside the emerging Places for Everyone joint development plan. The documents will form the basis for determining future proposals for the next 20 years. It will contain locally-specific planning policies.

²⁴ Greater Manchester Combined Authority/ Transport for Greater Manchester, (2016) Greater Manchester Low-Emission Strategy, December 2016 <https://www.greatermanchester-ca.gov.uk/media/1276/low-emission-strategy-dec-2016.pdf>

²⁵ Bury Council (1997) Bury Unitary Development Plan, 29 August 1997, <https://www.bury.gov.uk/planning-building-control/policy-and-projects/planning-policy/adopted-bury-unitary-development-plan>

²⁶ Bury Council, Bury Local Plan <https://www.bury.gov.uk/planning-building-control/policy-and-projects/planning-policy/bury-local-plan>

Policy / Guidance	Description
Local Development Scheme (2022) ²⁷	The scheme sets out the proposed programme and timescales for the production of Bury's Development Plan and other associated documents.
Bury Local Plan Policy Directions (2018) ²⁸	The Bury Local Plan is currently being prepared; this document sets out the broad direction that the Council would wish to take. The Local Plan will form part of Bury's overall development plan and provide non-strategic policies on non-strategic issues. The document states that: <i>"the Plan should contribute to the protection and enhancement of natural, built and historic assets, the improvement of air quality, reduced carbon emissions and adapt to the cause and effects of climate change."</i> Policy Direction OP4, relating to Air Quality and Pollution Control, states: <i>"It is proposed that the Local Plan should include a policy that seeks to prevent both new and existing development from contributing to, or being adversely affected by, unacceptable levels of pollution either individually or cumulatively with other existing or proposed developments. It is considered that the policy should also set out the issues that the Council will have regard to when considering the potential impact of development on pollution and what should be required from applicants, including mitigation measures, in the event that a proposal is considered to have the potential to give rise to any impacts on air quality or other forms of pollution."</i>
Other Relevant Policy and Guidance	
Defra Local Air Quality Management (LAQM) Policy Guidance (2022) ²⁹ and Technical Guidance (2022) ³⁰	The guidance issued under Part IV of the Environment Act 1995 is designed to help local authorities with their LAQM duties. The guidance sets out the general approach to use and detailed technical guidance to guide local authorities through the Review and Assessment process.
World Health Organisation (WHO) Global Air Quality Guidelines (2021) ³¹	Since 1987, WHO has periodically issued health-based air quality guidelines to assist governments and civil society to reduce human exposure to air pollution and its adverse effects. The WHO air quality guidelines published in 2006 provided health-based guideline levels for the major health-damaging air pollutants, including particulate matter (PM₁₀ and PM_{2.5}), ozone (O₃), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂). These guidelines had a significant impact on pollution abatement policies all over the world and led to the first universal frame of reference. Following extensive research which started in 2016 and has referred to numerous epidemiological studies, WHO have reassessed their guideline values and recently (September 2021) provided updated values.
IAQM Indoor Air Quality Guidance (2021) ³²	The IAQM have provided guidance on the assessment of indoor air quality. This was published in September 2021 and covers assessment, monitoring, modelling and mitigation relating to indoor air quality.
Covid-19: Supplementary Guidance, Local Air Quality Management Reporting in 2021 ³³	The guidance had been informed by responses from an impact survey received following the release of the interim statement on Covid-19 impacts to the LAQM regime. The guidance is to be read in conjunction with LAQM (TG22)

²⁷ Bury Council (2022) Local Development Scheme, February 2020, <https://www.bury.gov.uk/asset-library/local-development-scheme-feb-2022.pdf>

²⁸ Bury Council (2018) Bury Local Plan Policy Directions, October 2018, <https://www.bury.gov.uk/asset-library/bury-local-plan-policy-directions.pdf>

²⁹ Defra (2022) Local Air Quality Management Policy Guidance PG(22) <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-Policy-Guidance-2022.pdf>

³⁰ Defra (2022) Local Air Quality Management Technical Guidance (TG22) August 2022 <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>

³¹ World Health Organisation (WHO) (2021) WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, <https://apps.who.int/iris/handle/10665/345329>.

³² Institute of Air Quality Management (IAQM) (2021), Indoor Air Quality Guidance: Assessment, Monitoring, Modelling and Mitigation, version 1.0, September 2021, https://iaqm.co.uk/wp-content/uploads/2013/02/iaqm_indoorairquality.pdf

³³ Department for Environment, Food and Rural Affairs (Defra) / Greater London Authority (2021). Covid-19: Supplementary Guidance, Local Air Quality Management Reporting in 2021, April 2021, Version 1.0, <https://laqm.defra.gov.uk/supporting-guidance.html>

Policy / Guidance	Description
Environmental Protection (EPUK)/Institute of Air Quality Management (IAQM) Land Use Planning & Development Control (2017) ³⁴	This guidance has been produced to ensure that air quality is adequately considered in the land use planning and development control processes by relevant officers within local authorities, developers, and consultants involved in the preparation of development proposals and planning applications. This document is best practice guidance and has no formal or legal status.
IAQM Assessment of Dust from Demolition and Construction (2014) ³⁵	The document provides guidance for developers, their consultants and environmental health practitioners on how to undertake a construction impact assessment (including demolition and earthworks). The guidance provides a method for assigning a magnitude of risk (high, medium or low) and identifies appropriate mitigation measures.
IAQM assessment of air quality impacts on designated nature conservation sites ³⁶	This guidance signposts the appropriate thresholds used by local authorities, the Environment Agency and other regulators to determine the potential for air quality damage on sensitive ecological sites. Should threshold be likely to be exceeded, a suitably qualified and experienced ecologist is required to determine whether there is likely to be a significant impact on the habitat.

Table 2-4: Key Policy and Guidance

³⁴ Environmental Protection UK (EPUK)/Institute of Air Quality Management (IAQM), (2017) Land-Use Planning & Development Control: Planning for Air Quality <https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

³⁵ Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1) <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

³⁶ Institute of Air Quality Management (IAQM) (2020) A guide to the assessment of air quality impacts on designated nature conservation sites, version 1.1, May 2020, <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf>

3.0

Approach and Methodology

3.0 Approach and Methodology

3.1 Overall Approach

The overall approach of this air quality assessment comprises the following:

- A review of existing conditions within the study area, defined as 2km from the boundary of the Proposed Development, as this is considered to be the distance that provides sufficient data for the baseline assessment.
- An assessment of the potential to change in air quality conditions as a result of the construction and operation of the Proposed Development.
- The formulation of appropriate mitigation measures, where required, to mitigate any adverse impacts on air quality as a result of the construction and/or operation of the Proposed Development.

The scope and methodology of this assessment has been agreed with the Environmental Health Officer at Bury Council. The email correspondence is included as Annex B.

3.2 Existing Conditions

Existing ambient air quality conditions relates to relevant pollution that is already present in the environment from various sources such as industrial processes, commercial and domestic activities, road traffic emissions and natural resources.

Existing sources of emissions within the study area (2km) have been defined using several approaches, as follows:

- Local sources have been reviewed through examination of the latest Air Quality Annual Status Report³⁷.
- Background concentrations have been defined using the national pollution maps published by Defra³⁸. These cover the whole country on a 1x1 km grid.
- Industrial and waste management sources that may affect the area have been identified using the Environment Agency's Pollution Inventory Data³⁹.

3.3 Construction Phase

The site currently consists of the Longfield shopping centre, commercial buildings, Fairfax Group Practice medical centre and two car parks.

The development proposals comprise the following activities:

- Demolition activities (existing buildings)
- Construction of mixed-use buildings, including residential, office and retail properties and Travel Hub.

Machinery used during demolition and construction can generate new sources of emissions, as well as traffic movements to/from the site and the works themselves. When assessing the effect of dust emissions generated during construction works, receptors include those nearest to the construction boundary of the site in each direction. These receptors have the potential to experience effects of greater magnitude due to emissions of dust generated by the works, when compared with more distant receptors.

Without appropriate mitigation controls in place, there is the potential for adverse effects to occur during to the construction of the Proposed Development. The implementation of best practice mitigation controls can ensure any potential adverse effects would be not significant.

³⁷ Greater Manchester Combined Authority (2023) 2022 Air Quality Annual Status Report (ASR), June 2023
https://assets.ctfassets.net/tpqgbvy1k6h2/3eJDZpHcCKNK0ZO7TcUkl/3363e762b28868a832ab2200286a4841/Greater_Manchester_Air_Quality_Annual_Status_Report_2022.pdf

³⁸ Department for Environment, Food and Rural Affairs (Defra). Background Mapping data for local authorities, <https://uk-air.defra.gov.uk/data/lqm-background-home>

³⁹ Environment Agency, Pollution Inventory <https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory>

The impact of anticipated construction activities has been assessed in accordance with IAQM Guidance on the Assessment of Dust from Demolition and Construction v1.1 (2014). The construction phase assessment considers the anticipated physical activities occurring on-site that are likely to result in the generation of dust which gives rise to impacts on dust soiling and human health, especially through the generation of PM₁₀ and PM_{2.5}.

The assessment involves the identification of whether each phase of on-site activity (demolition, earthworks, construction, and trackout) represents a low, medium, or high risk of causing a significant effect and then identifies suitable mitigation measures for the relevant level of risk assigned. Details of the IAQM construction impact assessment procedure are presented in Annex C.

Best practice mitigation controls have been identified in accordance with IAQM guidance.

3.4 Operation Phase

EPUK/IAQM's guidance on Land-Use Planning and Development Control: Planning for Air Quality was issued to ensure that air quality is adequately considered in the land-use planning and developmental control process. A summary of the requirements is provided in Annex D. To determine the need for operational assessment, a screening assessment has been undertaken using the criteria outlined in the EPUK/IAQM guidance note (Annex E).

3.4.1 Combustion Plant Impact

Any on-site combustion plant such as boilers and combined heat and power (CHP) has the potential to impact air quality receptors both on and off-site. Emissions from combustion plant would include NO₂ and possibly also PM₁₀ and PM_{2.5} if diesel is used as a source.

Heating and cooling provision for the development will be provided by air source heat pumps powered by electricity. If there is a requirement for any back-up/standby diesel generators, it is assumed that these units will be operational for less than 50 hours per year, associated with required annual maintenance and testing. Should any generators be required, the location of their flues would need be considered with respect to the air handling unit air intakes and any openable windows or amenity spaces, with the aim of achieving a distance of at least 10 m horizontal separation, where feasible. Based on these conditions, the emissions from this source are not anticipated to be significant.

3.4.2 Road Traffic Impacts

The Proposed Development has the potential to impact existing air quality as a result of pollutants from road traffic exhaust emissions, such as NO₂, PM₁₀ and PM_{2.5}, associated with traffic travelling to and from the development during the operation phase.

The EPUK/IAQM guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant. Interpretation of this guidance was used to develop a methodology for the assessment of road impact emissions.

As the site is located within an AQMA, the EPUK/IAQM guidance states the following criteria to establish where an air quality assessment is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) movements; and
- A change of Heavy-Duty Vehicle (HDV) flows of more than 25 AADT movements.

The Transport Planners (Civic Engineers) have provided estimated trip rates for the mixed-use development. These are listed in Annex F and show that predicted increases in traffic flows as a result of the Proposed Development are greater than 100 AADT on a number of road links in the area. As the change in flows associated with the Proposed Development are predicted to be above the threshold listed in the EPUK/IAQM guidance, the effects of emissions from operational traffic have been assessed using ADMS-Roads Extra dispersion model. The methodology for this is detailed further in the following sections.

3.4.3 Human Exposure

Potential exposure of future occupants of the site was considered in accordance with Defra Local Air Quality Management (LAQM) Technical Guidance (TG22) and EPUK/IAQM Planning Guidance. This assessment evaluated the exposure that future occupants or visitors might experience associated with existing baseline conditions, considering the following:

- The background and future baseline air quality, and whether this will be likely to approach, or exceed, the threshold values set by the air quality objectives.
- The presence and location of air quality focus areas as an indicator of local hotspots where the air quality objective thresholds may be exceeded.
- The presence of any heavily trafficked roads, with emissions that could give rise to significantly higher concentrations of pollutants (e.g., NO₂), that would cause unacceptably high exposure for users of the new development; and
- The presence of non-road transport sources that may be significant, such as nearby airports, railway lines with high traffic usage of diesel locomotives⁴⁰ or coal-fired steam locomotive railway lines.

The current/baseline conditions were established qualitatively by reviewing relevant air quality information that is readily available from the Local Authority, including reports and historic monitoring data. These data were used to understand current/baseline pollutant concentrations at receptors within the study area, and the risk that any changes in air quality may cause exceedance of AQOs at these locations.

Detailed dispersion modelling was used to undertake assessment of human exposure. The methodology for this is detailed further in the following sections.

3.4.4 Dispersion Model

Detailed dispersion modelling of NO_x, PM₁₀ and PM_{2.5} emissions from operational traffic (including consideration of the car park) was used to undertake assessment of human exposure at the existing receptors close to the modelled road network and proposed future on-site receptors. This has been carried out using the latest version of ADMS-Roads Extra (version 5.0.1.3), which is an internationally recognised new generation dispersion model developed by CERC. ADMS uses advanced algorithms to describe the boundary layer structure, turbulence and stability.

The inputs required for the modelling are outlined in the following sections.

3.4.4.1 Traffic Data

Traffic data was provided by the Transport Planners (Civic Engineers).

The latest full year of ratified monitoring data available at the time of writing was 2022, so 2022 was therefore modelled as the baseline year to enable verification with local monitoring data. The assessment scenarios modelled are as follows:

- 2022 baseline scenario.
- 2031 opening year without the Proposed Development (2031 Do-Minimum (DM scenario)).
- 2031 opening year with the Proposed Development (2031 Do-Something (DS scenario)).

For each road link for each scenario, the following data has been included in the model:

- 24-hour Average Annual Daily Traffic (AADT) flows,
- % Heavy Good Vehicles (HGVs)
- Vehicle speeds based on speed limits, reduced to 20kph at junctions.

A summary of the traffic data for the modelled road links is provided in Annex F.

⁴⁰ Defra (2022), Local Air Quality Management Technical Guidance (TG22) - which lists rail lines with a heavy traffic of diesel passenger trains

3.4.4.2 Vehicle Emission Rates

Vehicle emission rates for NO_x, PM₁₀ and PM_{2.5} were obtained from the latest version of Defra's Emission Factor Toolkit (EFT v11.0)⁴¹, for the 'Urban (Not London)' area, with a 'Basic' traffic split format. In accordance with LAQM (TG22) guidance, speeds were reduced to 20 kph close to junctions.

Vehicle emission rates are expected to decrease in the future due to increasingly stringent Euro emission standards, but there is uncertainty as to the rate of improvement for NO_x emissions from diesel vehicles, considering recent measurements of exhaust emissions and ambient air quality. Future year scenarios have been modelled using both 2023 and 2031 emissions⁴², but retaining background concentrations from 2022, to provide an indication of the range of predicted results. Retaining emissions at current year (2023) is a conservative assumption, as some improvements are likely by the Proposed Development opening year of 2031. The modelled scenarios are listed as follows:

Worst-case scenario (use of 2023 emissions):

- Do-minimum (DM) with 2031 traffic flows without the Proposed Development in place and with 2022 backgrounds.
- Do-something (DS) with 2031 traffic flows with the Proposed Development in place and with 2022 backgrounds.

Realistic scenario (use of 2031 emissions):

- Do-minimum (DM) with 2031 traffic flows without the Proposed Development in place and with 2022 backgrounds.
- Do-something (DS) with 2031 traffic flows with the Proposed Development in place and with 2022 backgrounds.

3.4.4.3 Car Park Data

Emissions from vehicle movements within the existing surface level car park and proposed Travel Hub were also included in the modelling as volume and area sources as appropriate.

Car park emissions calculations input data and model inputs used are listed in Annex F.

3.4.4.4 Meteorological Data

Hourly sequential meteorological data is required as an input to the model. Data from Manchester Airport meteorological station for 2022 has been obtained used for this assessment. Manchester Airport is located approximately 19.9km south of the Site. Due to its location and elevation, Manchester Airport is considered to be the most representative meteorological station for the site. Both the location of the Site and Manchester Airport are inland sites, without significant terrain influence.

Defra's LAQM (TG22) guidance recommends that meteorological data should only be used if the percentage of usable hours is greater than 85%. Unusable hours include missing hours and calm hours⁴³. The 2022 dataset has been checked for usability. There are 8,760 lines of usable hourly data for 2022, which equates to 100% of the hourly in a year. As this is well above the 85% threshold, the data is considered to be adequate for dispersion modelling, in accordance with LAQM (TG22) guidance.

The 2022 wind rose for Manchester Airport is presented in Figure 3-1. It can be seen that the predominant wind direction is southerly.

⁴¹ Defra, Emissions Factors Toolkit <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>

⁴² For years 2031-2050, Version 11 includes Basic Fleet composition data provided by DfT/HE for England (non-London) only. This allows users to run the tool up to 2050 inclusive for England (non-London) areas. Whilst the tool will provide emissions outputs for 2031 to 2050, please note that the input assumptions embedded within the tool for these years may not fully align with those applied for the purposes of NAEI projections. Please also note that supporting LAQM tools, e.g. Background Mapping Data, NO₂ Adjustment for NO_x Sector Removal Tool, and the NO_x to NO₂ Calculator only support assessment years 2018-2030 inclusive. Emissions outputs for the years 2031-2050 are provided in support of climate assessments and appraisals. Where emissions are to be used after 2030 to inform air quality assessments, the appropriate caveats around the limitations of the analysis must be included to accompany the assessment. For all other areas, the tool may still only be ran up to 2030 inclusive.

⁴³ Wind speeds <0.75m/s would be classed as calm. ADMS Roads sets the speed to 0.75m/s for speeds <0.75m/s and uses the wind direction from the previous hour.

Manchester Airport Meteorological Station Wind Rose 2022

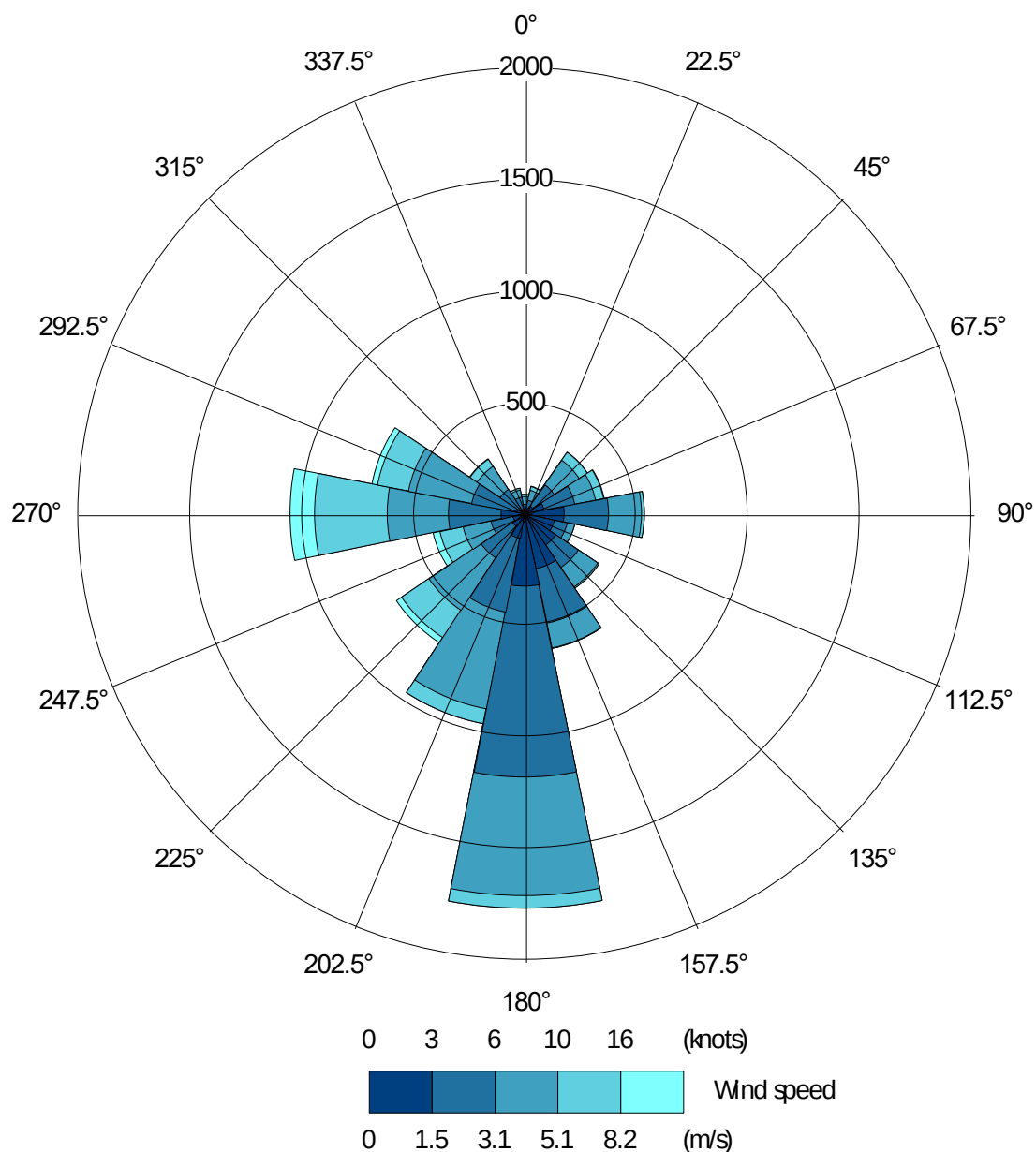


Figure 3-1: Wind Rose for Manchester Airport

Surface roughness is a component of surface texture. Air travelling over the surface is affected by the surface roughness, rough surface would result in higher roughness to smoother surfaces. Typical surface roughness values range from 1.5m (for cities, forests and industrial areas) to 0.0001m (for water or sandy deserts). The future setting of the Proposed Development has been considered in the modelling by setting the surface roughness length to 1.0m. This is the value recommended by the model developers for cities and woodlands. A surface roughness length 0.3m was used for the meteorological station, which is stated within ADMS-Roads as being suitable for 'agricultural' areas.

The Monin-Obukhov length is used to describe the effects of buoyancy on turbulence kinetic energy, particular in the lowest atmospheric boundary layer. This relates to the urban heat island effect, and its effects on turbulence due to surface topology and the effects from heated and shaded building surfaces. Monin-Obukhov values typically range from 2m to 10m in rural settings but can be higher in urban area where buildings and traffic results in more heat generation. In this assessment, the minimum Monin-Obukhov Length Scale was set to 30m (the recommended model setting for cities and large towns). A value of 10m was used for the land around Manchester Airport meteorological station.

3.4.5 Modelled Receptors

Future proposed on-site receptors and existing nearby receptors have been modelled to determine the concentrations of NO_x, PM₁₀ and PM_{2.5} associated with emissions from operational traffic. Existing receptors have been selected at worst case locations, closest to the modelled road network and including locations close to any junctions. The proposed receptor locations include proposed residential roadside facades within the development.

The modelled receptors are shown in Figure 3-2 and listed in Table 3-1. A height of 1.5m corresponds to a ground floor property and 4.5m a first-floor property. Receptor heights have been judged with reference to google satellite imagery.

Receptor ID	Receptor Name	Location		Floors	Heights (m)
		Easting	Northing		
Existing Receptors					
R1	Poppythorn Lane	381331.3	404256.1	GF	1.5
R2	Heys Road	381365.7	404229.0	1F	4.5
R3	Fairfax Road	381296.0	404195.6	GF	1.5
R4	Fairfax Road 2	381225.2	404170.0	1F	4.5
R5	Fairfax Road 3	381215.7	404178.7	1F	4.5
R6	Highfield Road	381204.5	404245.7	GF	1.5
R7	A56	381129.6	404144.0	1F	4.5
R8	A56 2	381141.0	404136.6	1F	4.5
R9	A56 3	381171.4	404071.8	1F	4.5
R10	A56 4	381234.9	403961.4	1F	4.5
R11	A56 5	381340.3	403767.7	GF	1.5
R12	A56 6	381281.0	403909.8	1F	4.5
R13	Rectory Lane	381374.8	403921.8	GF	1.5
R14	Rectory Lane School	381340.4	404025.6	GF	1.5
R15	Rectory Lane 3	381362.3	404036.9	GF	1.5
R16	A56 7	381083.5	404376.0	GF	1.5
R17	A56 8	381124.7	404260.8	GF	1.5
R18	Car Park 1	381262.0	404236.5	GF	1.5
R19	Car Park 2	381224.8	404258.9	GF	1.5
R20	Car Park 3	381220.3	404270.9	GF	1.5
R21	Car Park 4	381215.7	404283.0	GF	1.5
R22	Car Park 5	381212.3	404293.0	GF	1.5
R23	Car Park 6	381224.0	404298.0	GF	1.5
Proposed Receptors					
PR1	Proposed Residential	381335.8	404145.8	GF	1.5
PR2	Proposed Residential	381367.8	404062.3	GF	1.5

Table 3-1: Modelled Receptors



Figure 3-2: Modelled Receptors

3.4.5.1 Results Processing

3.4.5.2 Atmospheric Chemistry

NO₂ is associated with effects on human health and therefore the air quality standards for the protection of human health are based on NO₂ rather than total NO_x or NO. The model predicts NO_x concentrations which comprise nitric oxide (NO) and nitrogen dioxide (NO₂). NO_x is emitted from combustion processes primarily as NO with a small percentage (usually <5%) of NO₂. The emitted NO reacts with oxidants in the air (mainly ozone) to form secondary NO₂. Factors affecting the rate of this oxidation occurs include the concentration of oxidants in the air, wind speed and temperature.

Predicted NO_x concentrations have been processed to determine annual mean nitrogen dioxide (NO₂) concentrations for comparison with the annual mean NO₂ objectives. A NO_x:NO₂ conversion has been applied to the modelled NO_x concentrations, in order to determine the impact of the NO_x emissions on ambient concentrations of NO₂.

For process contributions from operational traffic, Defra's NO_x to NO₂ calculator⁴⁴ was used with the 'All other urban UK traffic' mix assumed.

⁴⁴ Department for Environmental Food & Rural Affairs (Defra), Background Maps <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/background-maps/>

3.4.5.3 Background Pollutant Concentrations

The annual mean background and modelled roads from ADMS-Roads were added together to give total concentrations and enable a comparison to be made with the air quality criteria for annual mean concentrations. The background concentrations used in the results processing are discussed in Section 4.2.

In the absence of any local urban background monitoring for consideration, Defra modelled background concentrations were used to process the NO₂, PM₁₀ and PM_{2.5} results.

Modelling was undertaken using 2023 and 2031 emissions but retaining backgrounds at baseline year (2022) in all scenarios, to provide an indication of the anticipated results without background concentration improvement, as a conservative assessment.

3.4.5.4 Comparison with Air Quality Standards

The results of dispersion modelling at sensitive residential receptors have been compared to relevant air quality objectives for the protection of human health listed in Table 2-2.

3.4.5.5 Model Verification

Using the guidance provided in Chapter 7 of LAQM (TG22), the modelled output from operational traffic has been verified against local monitoring data obtained from diffusion tube surveys operated by Bury Council. Full details are provided in Annex G.

The performance of the dispersion model was assessed by comparing the modelled concentrations with measured concentrations. Meteorological data, monitored concentrations, vehicle emission rates and traffic data for 2022 were all used in the model verification process.

The model adjustment was undertaken using methodology which requires the determination of the ratio between the measured and modelled road contributed NO_x at each comparison site. The ratio between them, referred to as the adjustment factor, is applied to the modelled road contributed NO_x. The modelled NO₂ is then determined using the Defra NO_x/NO₂ calculator⁴⁵.

An adjustment factor was calculated using Defra background NO₂ concentrations, in accordance with the methodology prescribed in LAQM (TG22). The calculated adjustment factor was 2.150. As this is >1 and the difference between model and monitored results was underpredicting by over 25%, it was decided to apply the adjustment factor, which increased the predicted values; this is considered to be a robust and conservative approach.

In accordance with Defra guidance, the road contributed NO_x adjustment factor was also applied to the road contributed PM concentration. The total PM₁₀ and PM_{2.5} concentrations are derived by adding the adjusted road contribution value to the Defra background concentrations.

⁴⁵ Department for Environmental Food & Rural Affairs (Defra) NO_x to NO₂ Calculator <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/>

4.0

Site Description and Baseline Conditions

4.0 Site Description and Baseline Conditions

To assess the significance of any new development proposal (in terms of air quality), it is necessary to identify and understand the baseline air quality conditions in and around the study area. This provides a reference against which any potential changes in air quality can be assessed. Since air quality is predicted to change in the future (mainly because of changes to vehicle emissions), the baseline situation is extrapolated forward to the opening year. The future baseline scenario is the predicted baseline for the opening year.

To identify the existing air quality conditions, a review of publicly available information has been undertaken, including the latest local authority air quality reports, monitoring data, and background concentration maps. This section presents the results of the review.

4.1 Local Air Quality Management

The Environment Act 1995 requires local authorities to review and assess air quality with respect to the objectives for seven pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an assessment and provide an Annual Status Report (ASR) of their area every year. If the ASR identifies any potential hotspot areas likely to exceed air quality objectives, a detailed assessment of those areas is required. If objectives are not predicted to be met, the local authority must declare the area as an Air Quality Management Area (AQMA). If an AQMA has been declared, the Local Authority will also need to produce an Air Quality Action Plan (AQAP), to include measures to improve air quality in the AQMA.

The Proposed Development is located in Bury, and the baseline assessment includes a brief review and summary of Greater Manchester Combined Authority's latest LAQM Annual Status Report (ASR), AQAP⁴⁶, and available monitoring data⁴⁷. Road transport emissions are a major source of air pollution in the region, in particular for nitrogen dioxide (NO₂) and particulate matter (PM) at locations close to busy, congested roads where people may live, work or shop.

The Site is located adjacent to the Bury Air Quality Management Area (AQMA) which covers large portions of the main roads within the borough, including the A56 which borders the Proposed Development. Bury Council declared the AQMA in 2002 for exceedances of the annual mean NO₂ objective and 24-hour mean PM₁₀ objective. It was amended in 2007 to only include annual mean NO₂. The location of the Proposed Development in relation to the AQMA boundary is shown in Figure 4-1.

⁴⁶ Greater Manchester Combined Authority (2016) Greater Manchester Air Quality Action Plan 2016-2021, 2016
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKewj0iNvzpMz-AhXVVaQEHOQgPA00QFnoECA8QAQ&url=https%3A%2F%2Fwww.manchester.gov.uk%2Fdownloads%2Fdownloads%2Fid%2F24676%2Fgreater_manchester_air_quality_action_plan_-_2016-2021.pdf&usq=AOvVaw0HRh1ki-jCTVGOP63YDdlp

⁴⁷ <https://cleanairgm.com/data-hub/monitoring-reports/>

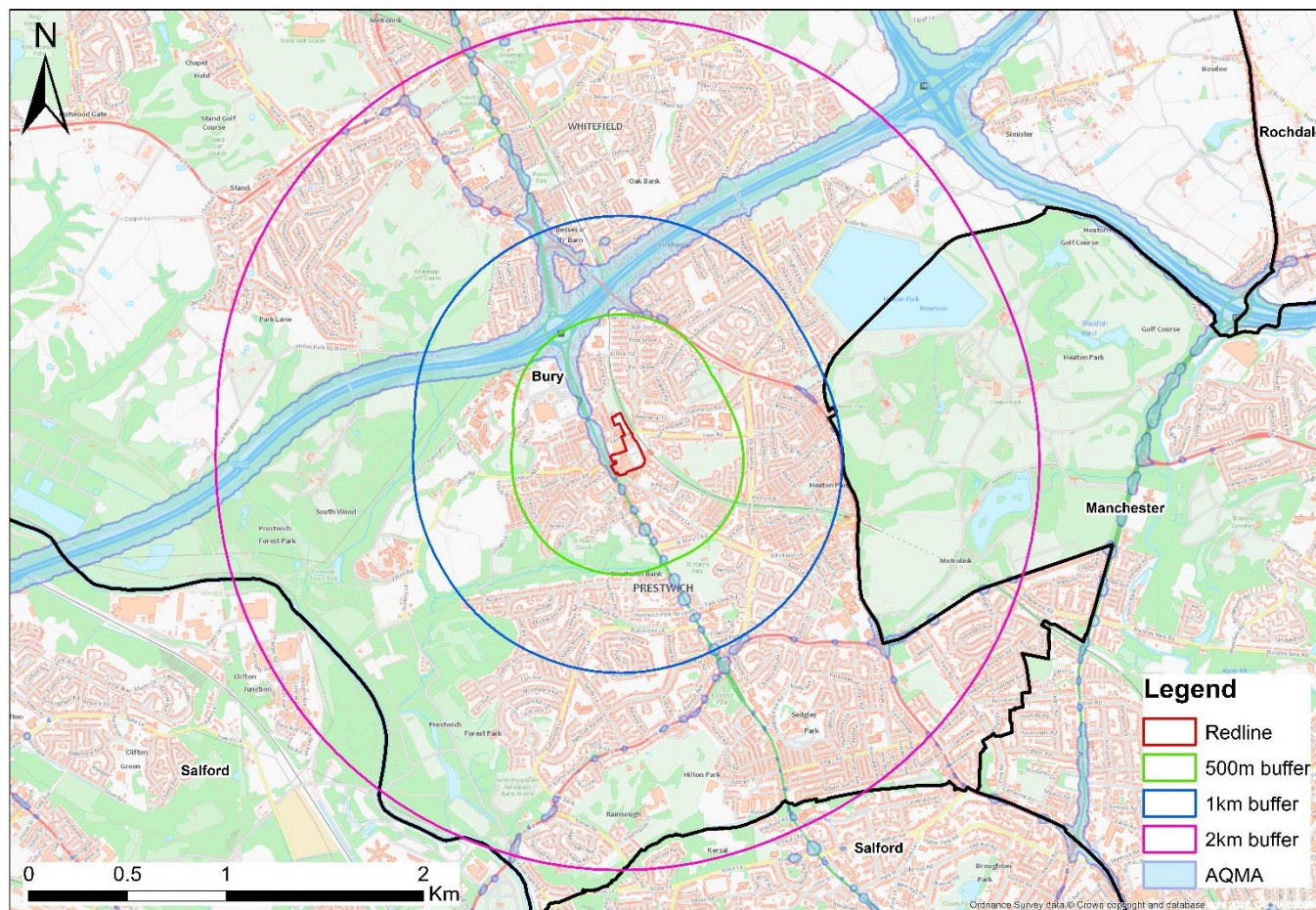


Figure 4-1: Air Quality Management Area (AQMA)

4.1.1 Local Air Quality Monitoring

A review of existing local air quality conditions in the vicinity of the Proposed Development has been undertaken. Automatic and diffusion tube monitors within 2km of the Proposed Development have been evaluated as part of this assessment.

4.1.1.1 Automatic Monitoring

Automatic or continuous monitoring involves drawing air through an analyser continuously to obtain near real-time pollutant concentration data. A review of the most recent ASR from Greater Manchester Combined Authority, which includes Bury, showed that there is one automatic monitoring station within 2km. The location of the automatic monitor is shown in Figure 4-2 and details about the automatic monitoring site are provided in Table 4-1.

Site ID	Site Location	OS Grid Reference		Site Type	Pollutants Monitored	Distance to kerb of nearest road (m)
		x	y			
BUR2	Bury Prestwich	381650	403222	Roadside	NO ₂ , PM ₁₀	2.5

Table 4-1: Details of Automatic Monitoring Sites within 2km

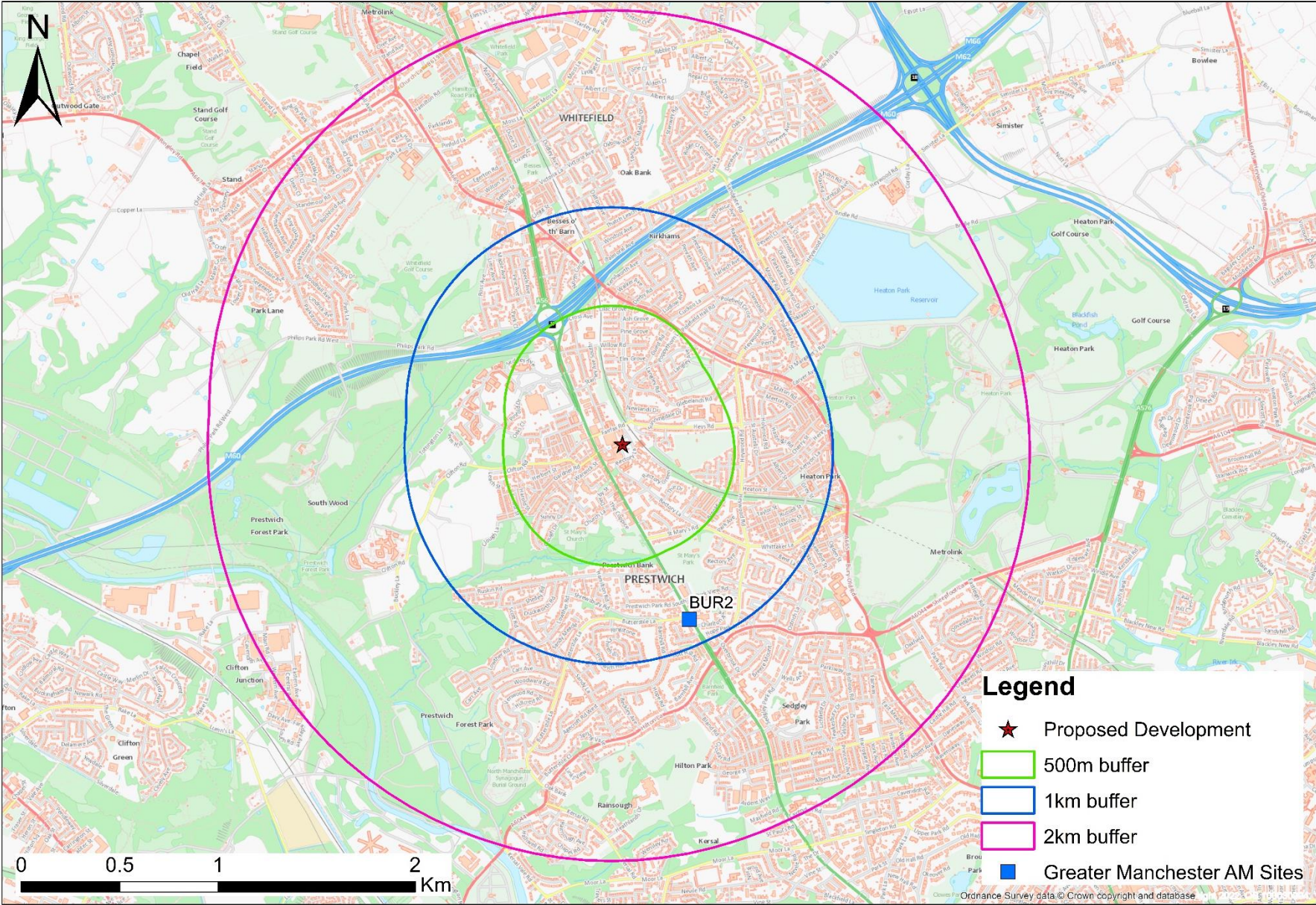


Figure 4-2: Automatic Monitoring Sites

Recent NO₂ monitoring results from 2017 to 2022 are shown in Table 4-2, with numbers of hourly exceedances of 200µg/m³ indicated in brackets. An exceedance is defined as an annual mean greater than 40µg/m³ for NO₂, or when the hourly value exceeds 200µg/m³ more than 18 times within a calendar year. Any exceedances of the objective thresholds are indicated in **bold**.

Site ID	Site Type	Distance from Site (km)	Annual Mean NO ₂ Concentration (µg/m ³)					
			2017	2018	2019	2020	2021	2022
BUR2	Roadside	0.95	42 (0)	38 (0)	39 (0)	-	33.3 (0)	30 (0)
Notes: Exceedances of the annual mean air quality objective are indicated in bold . “-” = no data available								

Table 4-2: Results of Local Air Quality Monitoring at Automatic Sites - NO₂

These results show that the NO₂ annual mean air quality objective has not been exceeded at the roadside site BUR2 since 2017, with a general downward trend from this time. The concentration recorded in 2022 was 30 µg/m³. BUR2 is located on the A56, and as the Proposed Development is also located on the A56, it is anticipated to provide an indicative value of expected NO₂ concentrations at the roadside boundary of the Site.

The short-term NO₂ objective was met at all locations during the monitoring period between 2017 and 2022. There have been no hourly exceedances of 200 µg/m³ recorded at the roadside site during this monitoring period and therefore the target of maximum 18 daily exceedances has been easily achieved. The concentrations recorded at the site during this monitoring period have been well below 60 µg/m³, and therefore exceedances of the short-term objective for NO₂ are considered to be unlikely.

Annual mean concentrations of PM₁₀ recorded at the monitoring site within 2km are shown in Table 4-3, with number of days exceedance shown in brackets. An exceedance is defined as an annual mean greater than 40 µg/m³ for PM₁₀, or when the daily value exceeds 50 µg/m³ more than 35 days within a calendar year.

Site ID	Site Type	Distance from Site (km)	Annual Mean PM ₁₀ Concentration (µg/m ³)					
			2017	2018	2019	2020	2021	2022
BUR2	Roadside	0.95	19 (4)	19 (1)	19 (9)	-	17.5 (1)	19 (6)

Table 4-3: Results of Local Air Quality Monitoring at Automatic Sites - PM₁₀

Annual mean concentrations of PM₁₀ have met the air quality objective (40 µg/m³) at this roadside monitoring site in all years monitored between 2017 and 2022. A maximum concentration of 19 µg/m³ was recorded at the roadside site in 2017-2019 and 2022. The number of daily exceedances of 50 µg/m³ have remained below the permissible 35 days per year, with a maximum of 9 days recorded in 2019 at the site.

There is no local monitoring of PM_{2.5}.

4.1.1.2 Non-Automatic Monitoring

The latest ASR indicates that Greater Manchester has 434 diffusion tubes monitoring NO₂ across the region, 19 of which are within 2km of the Proposed Development; these are classified as either “Kerbside” or “Roadside” sites. The locations of the sites within 2km are shown in Figure 4-3 and Figure 4-4.

Details of the diffusion tubes within 2km are given in Table 4-4.

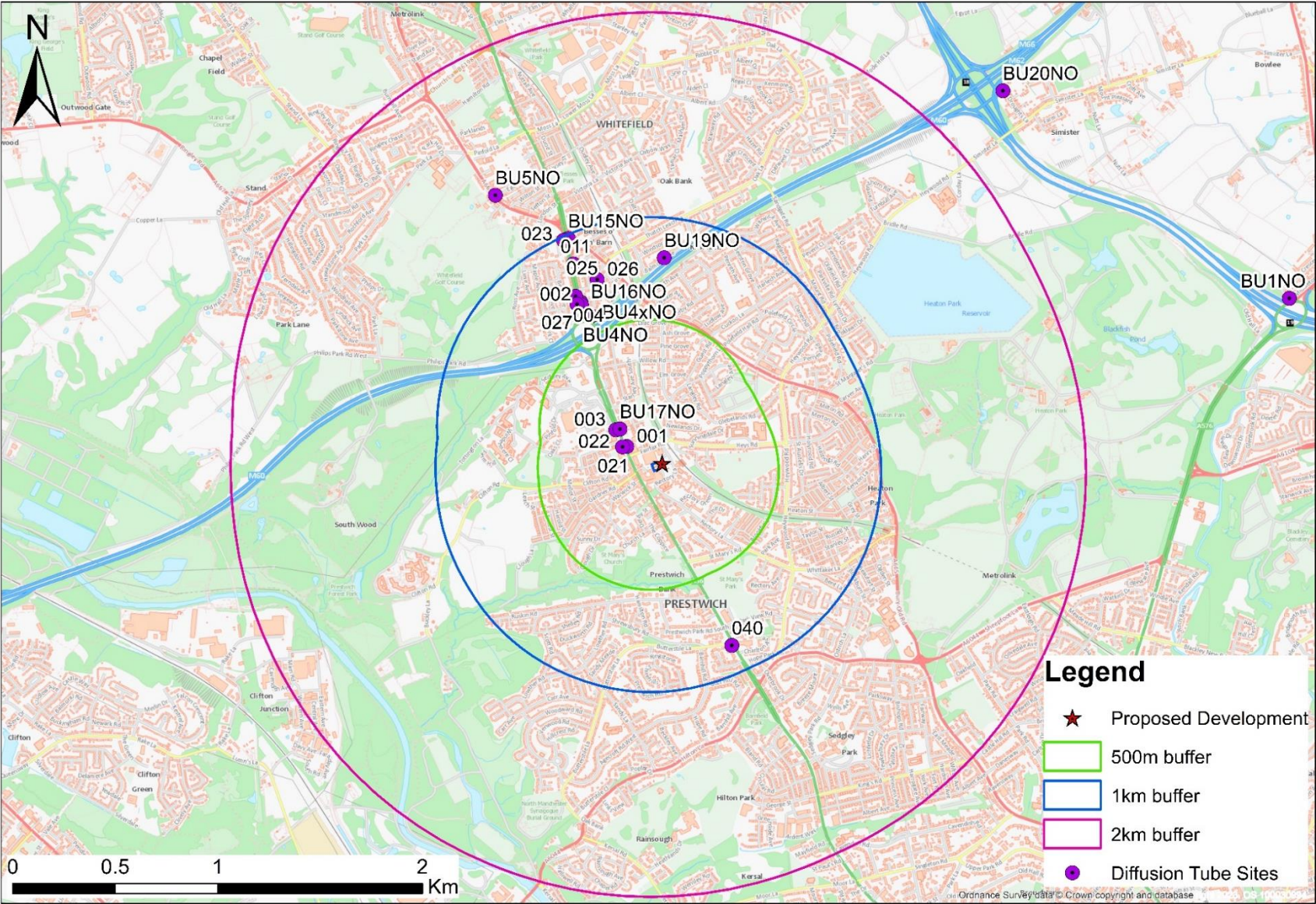


Figure 4-3: Local Diffusion Tube Sites

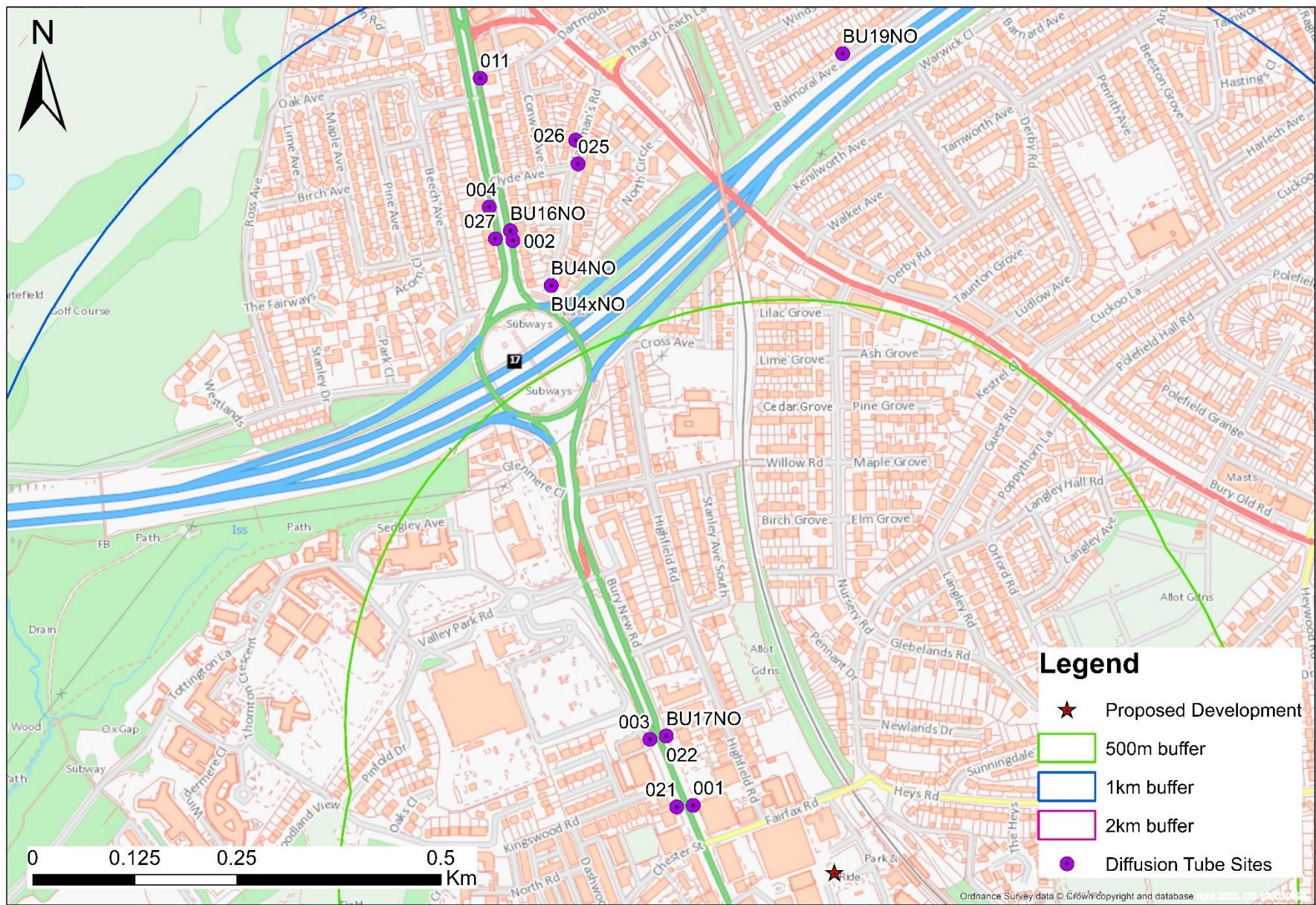


Figure 4-4: Local Diffusion Tubes Sites - A56

Site ID	Site Location	OS Grid Reference		Site Type	Distance to kerb of nearest road (m)
		x	y		
BU15NO	BU15	380852	405204	Kerbside	0.5
BU16NO	BU16	380916	404891	Roadside	2.2
BU17NO	BU17	381105	404279	Roadside	3
BU19NO	BU19	381321	405115	Roadside	12
BU4NO	BU4 10 Hardmans Rd Whitefield	380964	404831	Roadside	18.2
BU4xNO	10 Hardmans Road	380964	404831	Roadside	18.2
BU5NO	BU5 Radcliffe New Rd. Whitefield	380501	405413	Roadside	2.8
CAP_BURY_001	A56 (Bury New Road)	381138	404194	Roadside	0.7
CAP_BURY_002	A56 (Bury New Road)	380917	404886	Roadside	2.4
CAP_BURY_003	A56 (Bury New Road)	381085	404275	Roadside	2.6
CAP_BURY_004	A56 (Bury New Road)	380888	404927	Roadside	2.4
CAP_BURY_011	A56 (Bury New Road)	380877	405085	Roadside	2.2
CAP_BURY_021	A56 Bury New Rd	381118	404192	Roadside	2.2
CAP_BURY_022	A56 Bury New Rd	381105	404279	Roadside	3
CAP_BURY_023	A56	380830	405200	Roadside	1.8
CAP_BURY_025	Hardmans Rd	380997	404980	Roadside	1.4
CAP_BURY_026	Hardmans Rd	380994	405009	Roadside	1.3
CAP_BURY_027	A56	380896	404888	Roadside	2.4
CAP_BURY_040	A56 Prestwich	381651	403222	Roadside	3.1

Table 4-4: Details of Diffusion Tube Monitoring Sites within 2km

Recent monitoring results are given in Table 4-5. An exceedance is defined as an annual mean greater than 40 µg/m³ for NO₂. Any exceedances of the objective are indicated in **bold**.

Site ID	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)					
		2017	2018	2019	2020	2021	2022
BU15NO	Kerbside	-	-	46.6	34.4	37.4	40.5
BU16NO	Roadside	-	-	46.8	32.5	36.1	39.0
BU17NO	Roadside	-	-	35.4	25.7	28.2	28.6
BU19NO	Roadside	-	-	42.1	32.7	33.1	37.7
BU4NO	Roadside	-	-	39.2	27.4	28.4	31.8
BU4xNO	Roadside	31.9	31.2	-	-	-	-
BU5NO	Roadside	-	-	27	21.1	20.9	21.0
CAP_BURY_001	Roadside	-	-	30	30	35.2	34.6
CAP_BURY_002	Roadside	-	-	32.1	32.1	35.1	35.8
CAP_BURY_003	Roadside	-	-	32.9	32.9	36.4	36.2
CAP_BURY_004	Roadside	-	-	38.4	38.4	44.4	45.2
CAP_BURY_011	Roadside	-	-	37.3	37.3	41.2	42.7
CAP_BURY_021	Roadside	-	-	-	-	-	33.2
CAP_BURY_022	Roadside	-	-	-	-	-	28.2
CAP_BURY_023	Roadside	-	-	-	-	-	37.1
CAP_BURY_025	Roadside	-	-	-	-	-	25.9
CAP_BURY_026	Roadside	-	-	-	-	-	26.9
CAP_BURY_027	Roadside	-	-	-	-	-	42.4
CAP_BURY_040	Roadside	-	-	-	-	-	33.1
Notes: Exceedances of the annual mean air quality objective are indicated in bold .							
"-" = no data available							

Table 4-5: Diffusion Tube Monitoring Results 2017 to 2022

Of the 19 diffusion tube monitoring locations within 2km, six of the sites exceeded the NO₂ objective (40 µg/m³) during the period between 2017 and 2022. The maximum recorded concentration was 46.8 µg/m³, recorded at BU16NO in 2019, a roadside site located on the A56 at a junction with the M60. The maximum recorded concentration in 2022 was 45.2 µg/m³ at site CAP_Bury_004, located just north of site BU16NO.

The Proposed Development is located on the A56, 850m from the junction with the M60. Sites CAP Bury 003, 021, and 022 are located closest to the Proposed Development, further along the A56 and are therefore assumed, to be most representative of roadside concentrations, from available data. Annual mean NO₂ concentrations recorded at these sites during this monitoring period have remained below the annual mean objective and ranged from 28.2 µg/m³ to 36.2 µg/m³ in 2022.

The annual mean NO₂ concentrations recorded at all of the monitoring sites within 2km between 2017 and 2022 are well below 60 µg/m³. Exceedances of the short-term objective are therefore considered to be unlikely.

4.2 Defra's Background Pollutant Concentration Mapping

Background concentrations refer to existing levels of pollution in the atmosphere, as a result of emission from a variety of sources, such as traffic, industrial and agricultural processes. Defra publishes background pollutant mapping⁴⁸ for every 1km x 1km OS grid square across the UK for NO_x, NO₂, PM₁₀ and PM_{2.5} for 2018-2030. Background pollutant mapping has been reviewed for the grid square in which the Proposed Development lies and surrounding grid squares. The 2022 (baseline) and 2030 (closest available date to the proposed opening year of 2031) background concentrations (which are based on 2018 monitoring data) are presented in Table 4-6.

OS Grid Square		Annual Mean Concentration (µg/m ³)							
		NO _x		NO ₂		PM ₁₀		PM _{2.5}	
X	Y	2022	2030	2022	2030	2022	2030	2022	2030
381500	404500	27.7	20.2	19.5	14.6	13.6	13.2	9.0	8.7
381500	405500	27.9	19.5	19.7	14.3	13.6	13.3	9.0	8.7
380500	404500	30.8	21.3	21.3	15.4	12.9	12.5	8.4	8.1
382500	404500	20.3	15.4	14.8	11.5	11.6	11.2	7.8	7.5
381500	403500	21.1	16.2	15.3	12.1	11.8	11.4	8.0	7.7
Average:		25.6	18.5	18.1	13.6	12.7	12.3	8.4	8.1

Table 4-6: Defra's 2022 and 2030 background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5}

Defra background concentrations are all below the air quality objectives for annual mean NO₂ and PM₁₀ and PM_{2.5}.

4.3 Local Transport Sources of Pollution

The presence of any heavily trafficked roads, with emissions that could give rise to significantly higher concentrations of pollutants (e.g., NO₂), may cause unacceptably high exposure for users of the new development. The emissions from roads in the area are assumed to be represented in the Defra background concentrations used.

Traffic data was provided by the Transport Planners (Civic Engineers). This data has been used in the dispersion modelling assessment and is discussed further in Section 3.4.4 and listed in Annex F.

There are tram lines located within 50m of the Proposed Development. As these are electrified lines, they are not a source of rail emissions and are therefore not considered further.

⁴⁸ <https://lagm.defra.gov.uk/review-and-assessment/tools/background-maps.html>.

4.4 Local Industrial Sources of Pollution

Industrial air pollution sources are regulated through operating permits or authorisations, which list stringent emission requirements. Regulated industrial processes are classified as either Part A or Part B processes and are regulated through the Pollution Prevention and Control (PPC) system⁴⁹ which has been transposed into National legislation⁵⁰. The larger, more polluting, Part A processes are regulated by the Environment Agency for emissions to air, water and land. The smaller, less polluting processes are regulated by the local authority for emission to air.

A review of the Environment Agency Pollutant Inventory for 2021 indicated that there are no Part A permit sites within 2km of the Proposed Development. The closest sites are operated by Magnesium Elektron Ltd and Biffa Waste Services Ltd, located 2.2km and 2.5km south-east of the Proposed Development, respectively. The locations of the nearest Part A sites are shown in Figure 4-5.

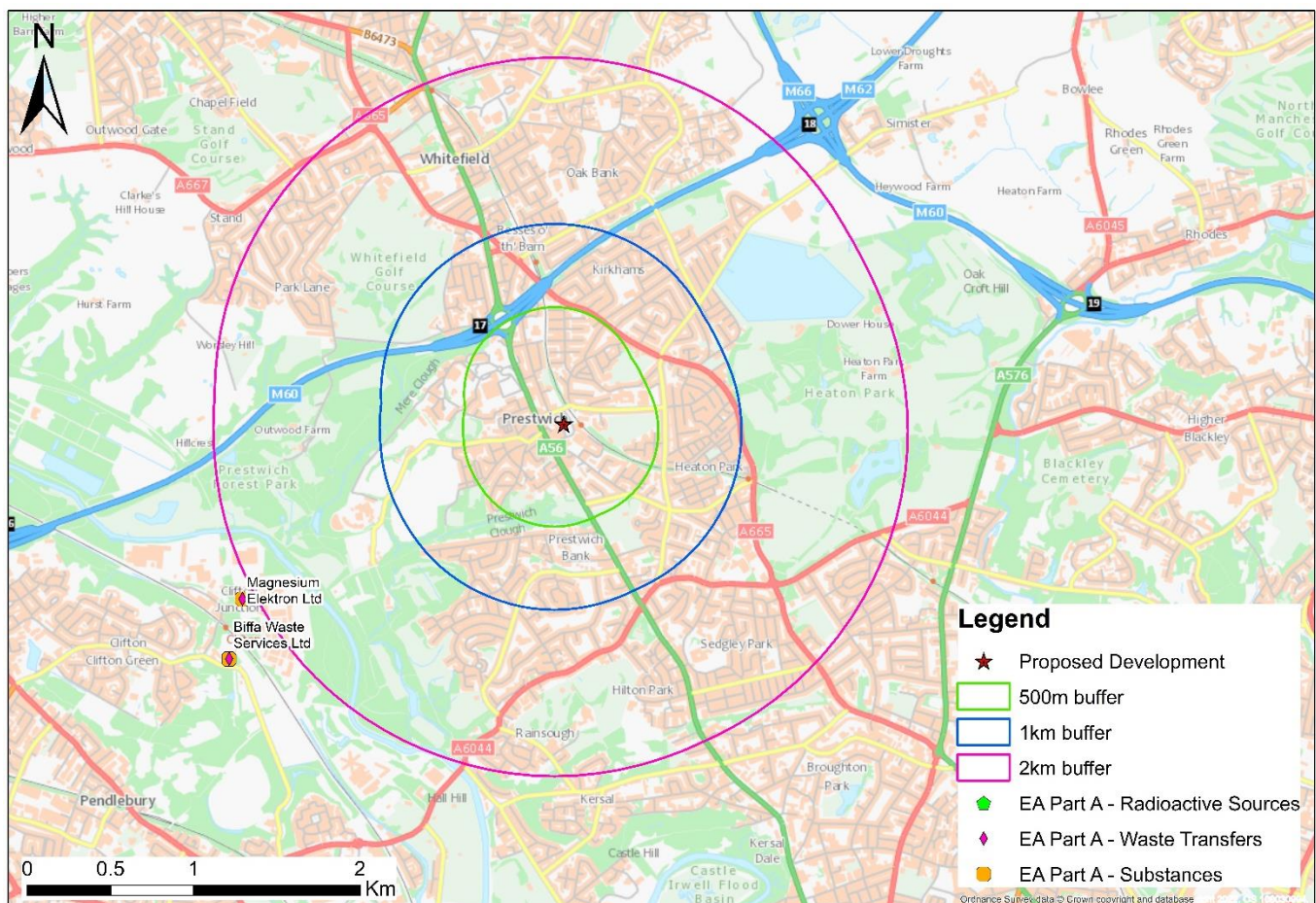


Figure 4-5: Part A Sites

The Part B processes are regulated and reviewed by the Local Authorities and given the nature of these processes, are unlikely to significantly affect ambient air quality in the vicinity of the Proposed Development.

Any emissions from these installations are assumed to be represented in the Defra background concentrations and are therefore not considered further.

⁴⁹ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

⁵⁰ The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

4.5 Sensitive Receptors

Sensitive receptors near the development were identified with reference to mapping data provided by Ordnance Survey. Sensitive receptors within 350m are illustrated in Figure 4-6 and include receptors within 20m of the red line boundary.



Figure 4-6: Sensitive Receptors

The site is located within a densely urbanised area. There are several properties surrounding the site including commercial and residential properties (apartments and residential estates). Commercial properties include, but are not limited to, All the Shapes bar, Dokes Pizzeria, Farmfoods, M&S Simply Food, and NatWest Prestwich. Residential properties include those located on Rectory Green, Highfield Place and Bury New Road, and Albion Mews apartment building. Additionally, there is a primary school located off of Rectory Lane. There are therefore several sensitive human receptors located within 350 m of the Site.

Defra MAGIC mapping⁵¹ has been reviewed to determine the presence of any sensitive ecological sites⁵². There are no designated ecological receptors with 500m of the site boundary, however, three are located within 2km. Mere Cough, Philip's Park and Kersal Moor are Local Nature Reserves (LNR), located approximately 800m north-west, 1.6km west and 1.9km south of the Proposed Development, respectively. The locations of nearby ecological receptors are illustrated in Figure 4-7.

⁵¹ Department for Environment, Food and Rural Affairs (Defra) (2019). MAGIC <https://magic.defra.gov.uk/MagicMap.aspx>

⁵² Typical ecological receptors of significance include Special Conservation Areas (SCAs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs), RAMSAR sites, Local Nature Reserves with dust sensitive features.

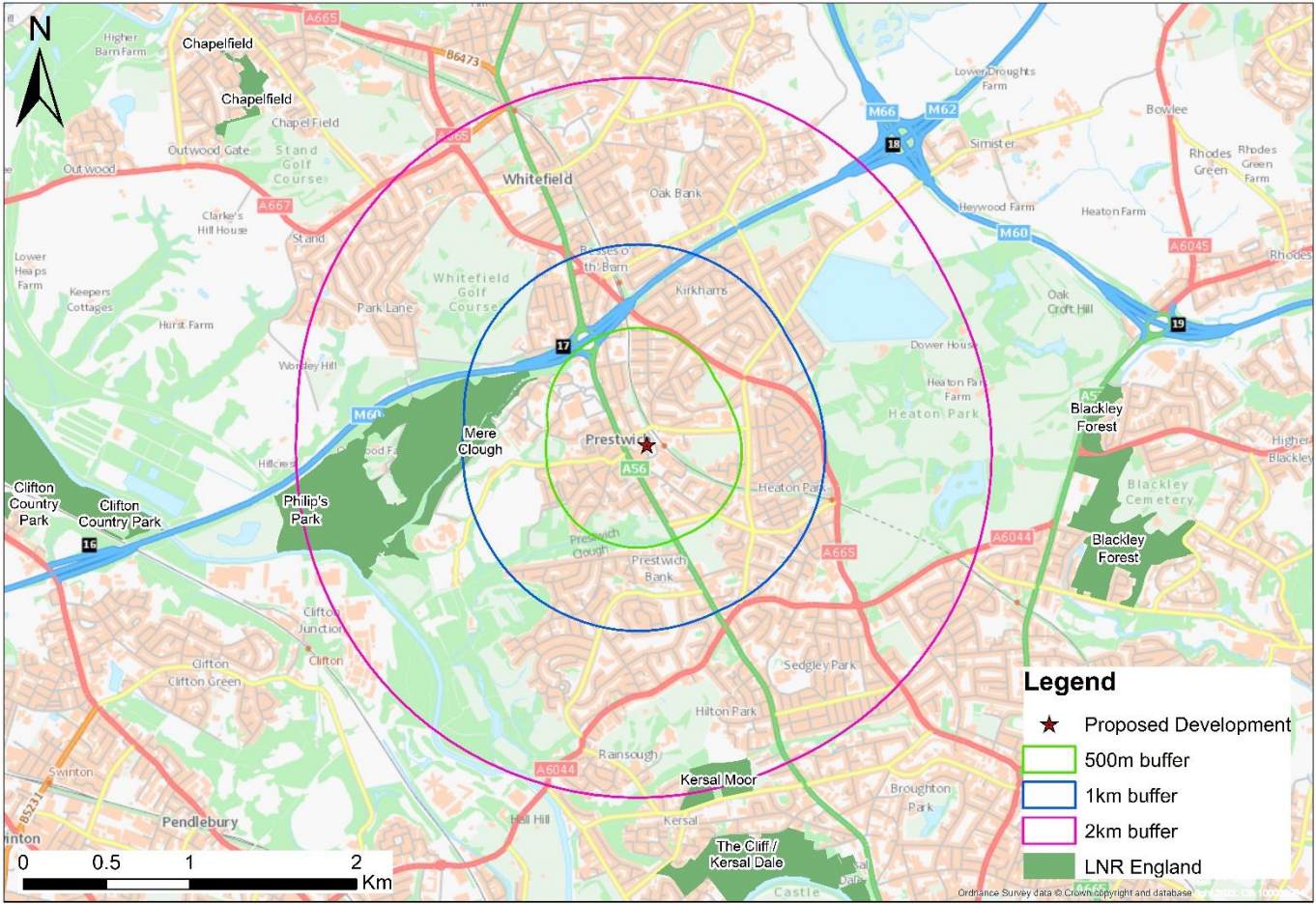


Figure 4-7: Sensitive Ecological Sites

5.0

Impact Evaluation

5.0 Impact Evaluation

5.1 Construction Phase Impacts

5.1.1 Need for a Detailed Assessment

An assessment was undertaken as there are 'human receptors' within 350m of the boundary of the site; and 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance.

5.1.2 Dust Emission Magnitude Analysis

The dust emission magnitude is based on the scale of the anticipated work and classified as Table 5-1 below. Details listed are based on indicative design information provided by the project team. Estimations/assumptions have been made where information is not available, based on our experience of similar sites and professional judgement.

Stage	Relevant Definition	Highest Potential Dust Emission Magnitude
Demolition	- Volume of buildings to be demolished is estimated to be >50,000m³ - Demolition materials are potentially dusty - The height of demolition activities above ground are estimated to be 10-20m above ground level - It is assumed that on-site crushing and screening may take place	Large
Earthworks	- Total site area is >10,000m² - It is estimated that the number of heavy earth moving vehicles active at any one time will be >10. - It is estimated that stockpile/bund height may be >8m	Large
Construction	- Total building volume to be constructed is estimated to be >25,000-100,000m³ - Potentially dust construction material (concrete piles) - It is assumed that concrete batching and sandblasting may take place	Medium-Large
Trackout	Estimated to be 10-50 HDV (>3.5 tonnes) outward movements in any one day - The surface material is potentially dusty - The length of unpaved road within the site is estimated to be >100m	Medium-Large

Table 5-1: Determination of the potential dust emission magnitude

The highest dust emission magnitude is likely to be **large**.

5.1.3 Sensitivity of the Area

The surrounding area has a significant density of sensitive receptors, which have wide range of sensitivities to dust soiling and health effects. The numbers of these receptors likely to be affected by demolition, earthworks and construction activities during the construction phase has been assessed. The analysis involved counting receptors within each of the distance bands from the site boundary (20, 50, 100, 200 and 350m), as illustrated in Figure 5-1.

There are 10 to 100 high sensitivity receptors within 20m of the Proposed Development boundary. The sensitivity of the area to dust soiling effects on people and property from demolition, earthworks and construction activities is therefore **high**. The Defra PM₁₀ background concentration in the area of the Proposed Development is <24µg/m³. There are 10 to 100 high sensitivity receptors within 20m of the Proposed Development boundary. The sensitivity of the area to human health impacts for demolition, earthworks and construction activities is therefore **low**.

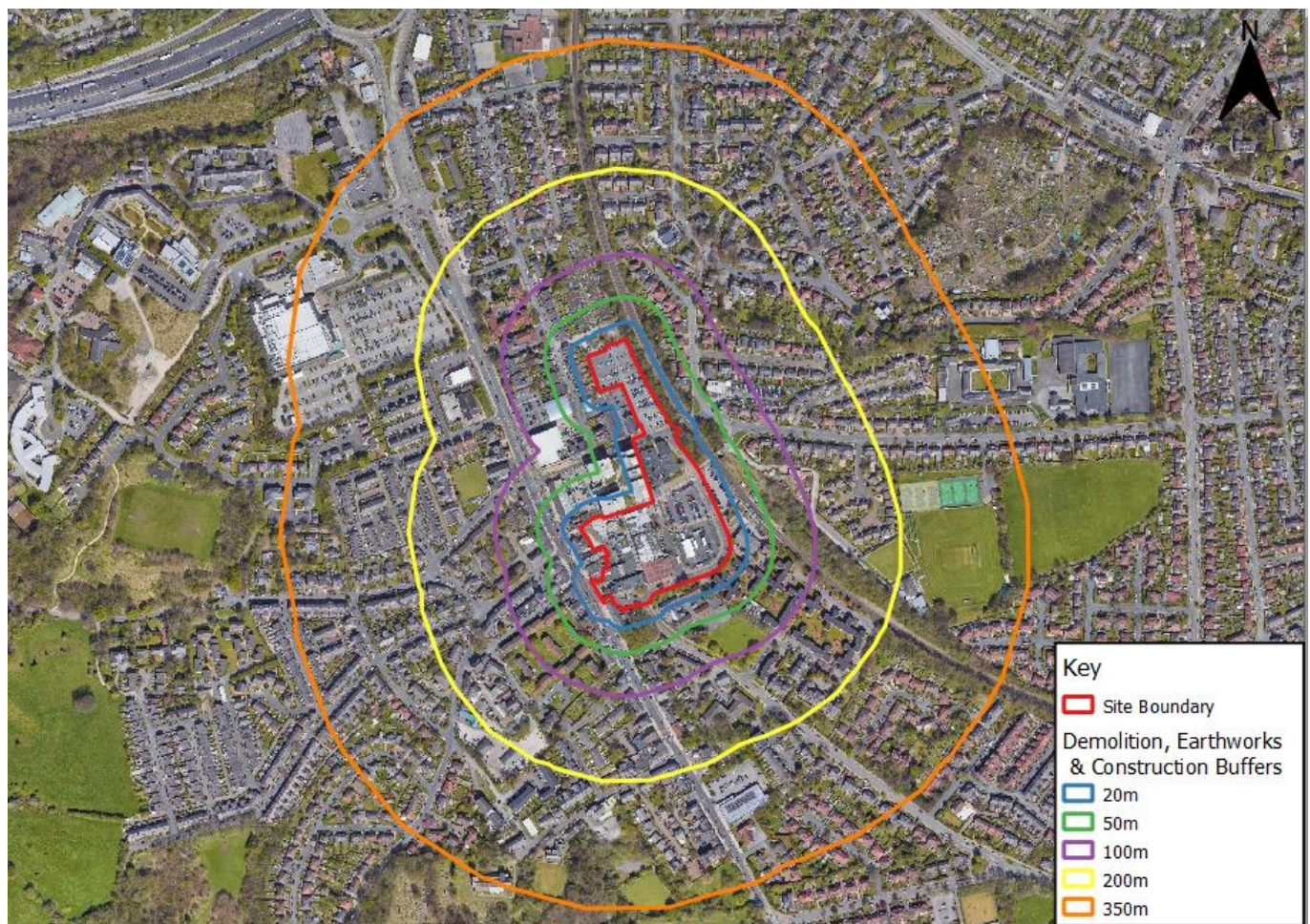


Figure 5-1: Construction Dust Buffer Zones (courtesy of Google Satellite)

Sensitive receptors are also susceptible to dust soiling and health effects resulting from construction vehicle trackout. The IAQM guidance states that trackout may occur from roads up to 500m from large sites, 200m from medium sites, and 50m from small sites. It is understood that construction traffic will use Fairfax Road and Rectory Lane to access and egress the site. As the trackout dust emission magnitude is medium-large, a 500m distance band has been applied accounting for sensitive receptors 50m from the construction traffic route (Figure 5-2).

There are >100 high sensitivity receptors within 20m of the Proposed Development trackout boundary. The sensitivity of the area to dust soiling effects on people and property from trackout activities is therefore **high**. The Defra PM₁₀ background concentration in the area of the Proposed Development is <24µg/m³. There are >100 high sensitivity receptors within 20m of the trackout boundary (along roads used by construction traffic within 500m of the site exit). The sensitivity of the area to human health impacts for trackout activities is therefore **low**.

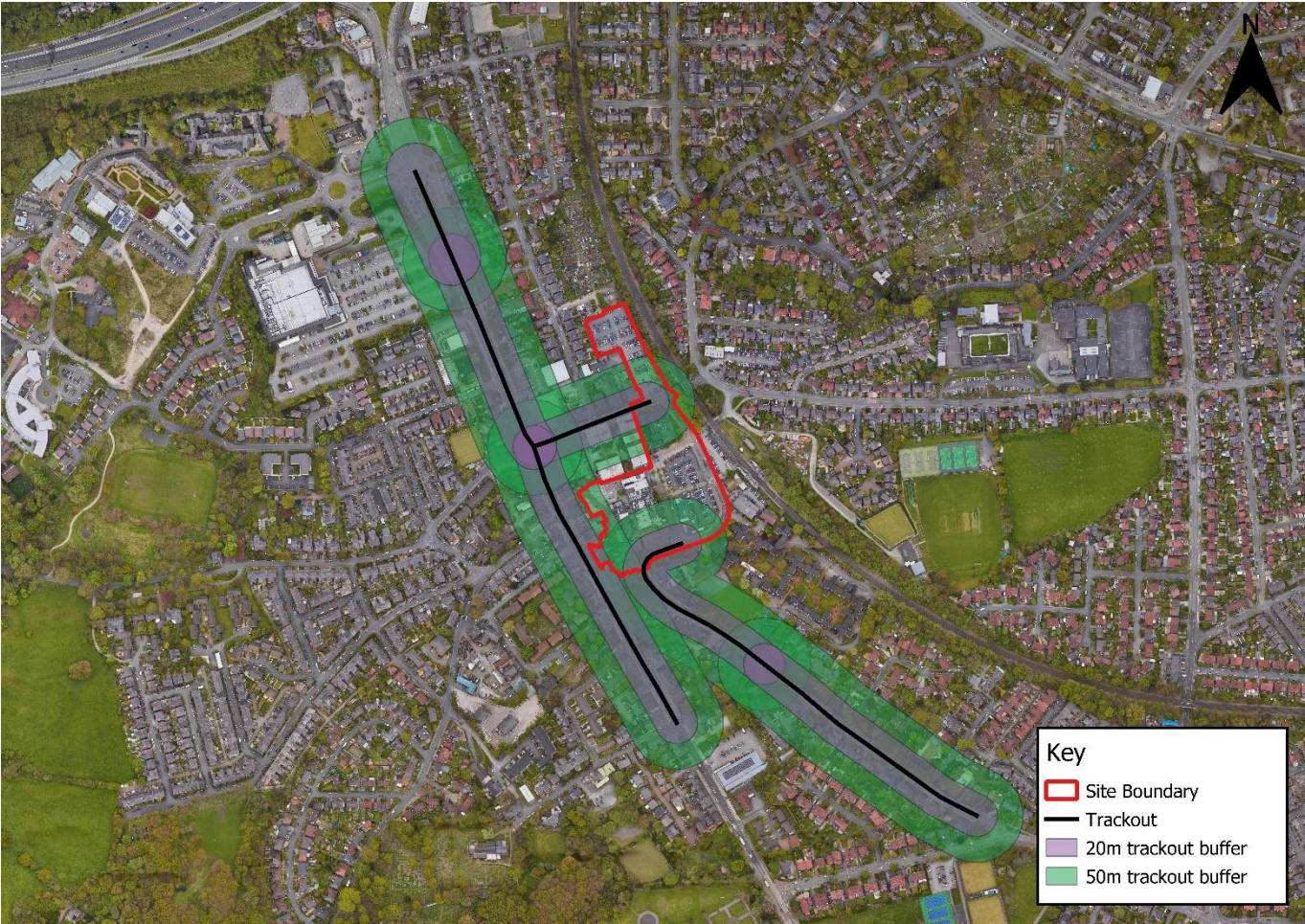


Figure 5-2: Trackout Buffer Zones (courtesy of Google Satellite)

Defra MAGIC mapping has been reviewed to determine the presence of any sensitive ecological sites. There are no designated ecological receptors sensitive to dust within 500m of the site boundary and therefore the sensitivity of the area to ecological receptors is negligible.

Table 5-2 summaries the assessment of sensitivity of the area.

Potential Impact	Sensitivity of the Area		
	Description	During Demolition, Earthworks and Construction	During Trackout
Dust Soiling	Receptor sensitivity	High	High
	Number of receptors and distance from source	10-100 residential properties within 20m of the site boundary	10-100 residential properties within 20m of the trackout boundary
	Sensitivity of the Area	High	High
Human Health	Receptor sensitivity	High	High
	Annual mean PM ₁₀ concentration	<24 µg/m ³	<24 µg/m ³
	Number of receptors and distance from source	10-100 residential properties within 20m of the site boundary	>100 residential properties within 20m of the trackout boundary
	Sensitivity of the Area	Low	Low
Ecological	Receptor sensitivity	N/A	N/A
	Number of receptors and distance from source	N/A	N/A
	Sensitivity of the Area	N/A	N/A

Table 5-2: Sensitivity of the Area Summary

5.1.4 Risk of Impact

The dust emission magnitudes have been combined with the sensitivity of the area to determine the overall risk of dust impacts with no mitigation applied. The risk of impacts for dust soiling and human health for each construction activity are summarised in Table 5-3.

Potential Impact (Sensitivity of the Area)	Dust Risk (Dust Emission Category)				Overall Risk
	Demolition (Large)	Earthworks (Large)	Construction (Medium-Large)	Trackout (Medium-Large)	
Dust Soiling (High)	High	High	Medium-High	Medium-High	High
Human Health (Low)	Medium	Low	Low	Low	Low-Medium
Overall Risk	High	High	Medium-High	Medium-High	High

Table 5-3: Risk of Impacts

The assessment has demonstrated that the risk of dust soiling without any mitigation is high for demolition, earthworks and medium-high for construction and trackout.

The risk of adverse human health effects of PM₁₀ without any mitigation is medium for demolition and low for earthworks, construction and trackout.

The overall risk of unmitigated impacts is **high** for demolition, earthworks, construction and trackout.

5.2 Operation Phase

5.2.1 Human Exposure

Dispersion modelling results are presented in Annex H.

Results are presented for the following scenarios:

Worst-case scenario (use of 2023 emissions):

- Do-minimum (DM) with 2031 traffic flows without the Proposed Development in place and with 2022 backgrounds.
- Do-something (DS) with 2031 traffic flows with the Proposed Development in place and with 2022 backgrounds.

Realistic scenario (use of 2031 emissions):

- Do-minimum (DM) with 2031 traffic flows without the Proposed Development in place and with 2022 backgrounds.
- Do-something (DS) with 2031 traffic flows with the Proposed Development in place and with 2022 backgrounds.

Interpretation of the results indicates the following:

- Exceedance of the national annual mean NO₂ objective is unlikely at all modelled receptor locations in all scenarios
- Since all modelled NO₂ values are well below 60 µg/m³, exceedance of national short-term NO₂ objectives is unlikely at all modelled receptor locations in all scenarios.
- Exceedance of national annual mean and short-term mean PM₁₀ objectives is unlikely at all modelled receptor locations in all scenarios.
- Exceedance of the national annual mean PM_{2.5} objective is unlikely at all modelled receptor locations in all scenarios.
- The predicted concentrations at receptors closest to the proposed Travel Hub (gardens of residents along Highfield Road and Highfield Place) did not exceed the air quality objectives for NO₂, PM₁₀, or PM_{2.5}.
- The impact of the Proposed Development on the AQMA adjacent to the Proposed Development is anticipated to be negligible.

6.0

Assumptions and Limitations

6.0 Assumptions and Limitations

6.1 Dispersion Modelling - General

No terrain data has been included within the model. Topographical features such as hills can have a significant effect on the dispersion of pollutants, generally when the ground level within 1km of the sources varies by more than 100m (1 in 10). A review of the local area indicated difference in height of <100m. The use of terrain data was therefore excluded from further consideration within the assessment.

6.2 Model Verification

The local air quality impacts were assessed based on the results from atmospheric dispersion modelling. A series of assumptions have been made in relation to the dispersion modelling used to predict impacts from the Proposed Development. These have been outlined in the impact assessment methodology outlined in Section 3.4.4.

The uncertainty in the predictions for the current baseline was reduced by carrying out model verification. It was concluded that model adjustment was required. This process is summarised in Annex G.

6.3 Background Concentrations and Traffic Emissions

Defra modelled background concentrations were used to process the NO₂, PM₁₀ and PM_{2.5} results.

Modelling was undertaken using 2023 and 2031 emissions but retaining backgrounds at 2022 concentrations in all scenarios, to provide an indication of the anticipated results without background concentration improvement, as a conservative assessment.

6.4 Construction Phase

Details for demolition, earthworks, construction and trackout listed are based on indicative design information provided by the project team. Estimations/assumptions have been made where information is not available, based on our experience of similar sites and professional judgement. The Proposed Development is to be delivered in two phases. However, due to the continuous nature of the construction programme, the phases have not been considered separately within the construction phase assessment.

7.0

Mitigation

7.0 Mitigation

7.1 Construction

The primary aim of the dust risk assessment is to identify the appropriate site-specific mitigation measures that will be adopted to ensure there will be no significant effect on local amenity and public health.

Full details of mitigation measures are presented in Annex I and have been selected based on the findings of the construction dust assessment (Section 5.1).

The Client will commit to the implementation of the best practice mitigation measures identified above during the construction phase of the development. It is anticipated that the generation of dust and harmful pollutants emissions from construction site activities will be reduced with the correct implementation of these measures.

Measures to control emissions during the construction phase will be included in an Air Quality and Dust Management Plan (AQDMP) forming part of a Construction Environmental Management Plan (CEMP) and a Construction Logistics Plan which conform to the requirements of Bury Council's requirements. This can be secured by a suitably worded planning condition.

7.2 Operation

It is anticipated that the impact of the operation phase on future site users is likely to be negligible, and therefore no mitigation measures are required.

Table 7-1 below shows a comparison between the current AQOs and the updated WHO guidelines⁵³. The update includes Air Quality Guideline (AQG) levels for the pollutants of relevance to this assessment (NO₂, PM₁₀ and PM_{2.5}) which are significantly lower than the previous WHO guidelines. Compliance with WHO recommended guidelines for residential and non-residential elements is considered 'best practice' but is non-mandatory at present, i.e. suitable control can be adopted on an 'as-required' basis.

As the site is mixed-use, the short-term and long-term objectives may apply.

Pollutant	Averaging Period	Air Quality Objective (AQO) (µg/m ³)	WHO Guidelines (µg/m ³)	
			Interim Target	AQG Level
NO ₂	Annual mean	40	40 to 20	10
NO ₂	24-hour mean	N/A	120 to 50	25
PM ₁₀	Annual mean	40	70 to 20	15
PM ₁₀	24-hour mean	50	150 to 50	45
PM _{2.5}	Annual mean	20	35 to 10	5
PM _{2.5}	24-hour mean	N/A	75 to 25	15

Table 7-1: Comparison of WHO Guidelines with National Air Quality Objectives

Whereas PM_{10/2.5} filtration is unlikely to be required for planning (as it considers exceedances of national air quality objectives), it is recommended to be considered for good practice design (as Building Regulations often consider WHO guidelines which are usually more stringent), see Table 7-1. Consideration should be main for integrating particulate filters into the intakes of the air handling units where this is practicable, to help strive towards achieving the more stringent WHO guideline values.

Under these conditions, it is anticipated that the exposure of future site users to poor air quality will be unlikely, and no additional mitigation measures will be required.

The IAQM have published comprehensive guidance on indoor air quality. Further consultancy advice on indoor air quality can be provided on request but is not currently a prerequisite for planning applications.

⁵³ World Health Organisation (WHO) (2021) WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, <https://apps.who.int/iris/handle/10665/345329>.

8.0

Residual Effects

8.0 Residual Effects

8.1 Construction

With appropriate mitigation in place, it is considered that the residual effects on dust soiling and human health from the construction phase activities would be reduced and not significant.

The mitigation measures required are detailed in Annex I and are based upon the IAQM guidance. Selection of appropriate mitigation measures should be based on the findings of the construction dust assessment (Section 5.1).

8.2 Operation

Residual effects on human health from operation phase emissions are expected to be negligible.

9.0

Discussion and Conclusion

9.0 Conclusion

This Air Quality Assessment has been prepared by Cundall on behalf of The Prestwich Regeneration LLP, a Joint Venture ('JV') between Bury Council and Muse Places and is submitted in support of an application for hybrid planning permission at "Prestwich Village". A review of current legislation and national and local policy has been made.

An assessment has been made of existing baseline air quality conditions and potential impacts associated with the construction and operation of the Proposed Development.

The Site is located adjacent to the Bury Air Quality Management Area (AQMA) which covers large portions of the main roads within the borough, including the A56 which borders the Proposed Development. Bury Council declared the AQMA in 2002 for exceedances of the annual mean NO₂ objective and 24-hour mean PM₁₀ objective. It was amended in 2007 to only include annual mean NO₂. Recent Bury Council monitoring data from nearby sites indicates that there is unlikely potential for nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) concentrations at the Site to exceed the National Air Quality Objective threshold levels.

Emissions of construction dust have been assessed using the qualitative approach outlined in the IAQM guidance. It was concluded that in the absence of any adequate mitigation, there is a high risk from the demolition, earthworks, construction and trackout dust-generating activities associated with the Proposed Development. However, with appropriate mitigation measures implemented, it is anticipated that the dust generation and harmful emissions from construction site activities will not be significant. An Air Quality and Dust Management Plan (AQDMP) (forming part of a Construction Environmental Management Plan (CEMP)/Construction Logistics Plan) which conforms to the requirements of Bury Council will be provided prior to the commencement of any on-site works to ensure that the mitigation measures recommended are implemented throughout the construction phase. This can be secured by a suitably worded planning condition.

Operation phase impacts are expected to be is likely to be negligible. Heating, cooling and hot water for the development will be provided by air source heat pumps powered by electricity. If there is a requirement for any back-up/standby diesel generators, it is assumed that these units will be operational for less than 50 hours per year. Should any generators be required, the location of their flues would need be considered with respect to the air handling unit air intakes and any openable windows or amenity spaces, with the aim of achieving a distance of at least 10 m horizontal separation, where feasible. Based on these conditions, the emissions from this source are not anticipated to be significant.

The assessment has demonstrated that exposure of existing receptors and future occupants to poor air quality is unlikely. No exceedances of the annual mean NO₂, PM₁₀ or PM_{2.5} objectives were predicted at any modelled receptor points in any modelled scenario. Since all modelled NO₂ values are below 60µg/m³, exceedance of national short-term NO₂ objectives is unlikely at all modelled receptors.

It is anticipated that the impact of the operation phase on existing receptors and future site users is likely to be negligible, and therefore no mitigation measures are required. However, consideration should be main for integrating particulate filters into the intakes of the air handling units where this is practicable, to help strive towards achieving the more stringent WHO guideline values. Under these conditions, it is anticipated that the exposure of future occupants to poor air quality will be unlikely, and no additional mitigation measures will be required.

It can therefore be concluded that there are no air quality constraints to the construction and operation of the Proposed Development.

10.0

References

10.0 References

AEA Energy & Environment (2008) Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the 1-hour mean AQS Objective, A report produced for the Department for Environment, Food and Rural Affairs, the Scottish Government, the Welsh Assembly Government and the Department of the Environment in Northern Ireland, Issue 1, May 2008, ref: AEAT/ENV/R/2641, https://laqm.defra.gov.uk/documents/NO2relationship_report.pdf

Air Quality Consultants / Environ (2014) Air Quality Neutral Planning Support Update: GLA 80371, April 2014 <https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=226d8d5e-d7e9-40e1-bf0d-85c4554496da>

Bury Council, Bury Local Plan <https://www.bury.gov.uk/planning-building-control/policy-and-projects/planning-policy/bury-local-plan>

Bury Council (2022) Local Development Scheme, February 2020, <https://www.bury.gov.uk/asset-library/local-development-scheme-feb-2022.pdf>

Bury Council (2018) Bury Local Plan Policy Directions, October 2018, <https://www.bury.gov.uk/asset-library/bury-local-plan-policy-directions.pdf>

Bury Council (1997) Bury Unitary Development Plan, 29 August 1997, <https://www.bury.gov.uk/planning-building-control/policy-and-projects/planning-policy/adopted-bury-unitary-development-plan>

Department for Environment, Food and Rural Affairs (Defra) / Greater London Authority (2021). Covid-19: Supplementary Guidance, Local Air Quality Management Reporting in 2021, April 2021, Version 1.0, <https://laqm.defra.gov.uk/supporting-guidance.html>

Department for Environment, Food and Rural Affairs (Defra) (2022). Local Air Quality Management Policy Guidance (PG22). <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-Policy-Guidance-2022.pdf>

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

Department for Environment Food & Rural Affairs (Defra) UK Air Information Resource (UK AIR), National air quality objectives, https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

Department for Environment, Food and Rural Affairs (Defra) (2019). The Clean Air Quality Strategy. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

Department for Environment, Food and Rural Affairs (Defra) (2019) Interactive monitoring networks map, <https://uk-air.defra.gov.uk/interactive-map>

Department for Environment, Food and Rural Affairs (Defra) (2019) Background Mapping data for local authorities (<http://uk-air.defra.gov.uk/data/laqm-background-home>).

Department for Environment, Food and Rural Affairs (Defra) (2019). MAGIC <https://magic.defra.gov.uk/>

Department for Environment, Food and Rural Affairs (Defra). Department for Transport (DfT) (2017). UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations. July 2017 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633269/air-quality-plan-overview.pdf

Department for Environment, Food and Rural Affairs (Defra) (2012) UK Pollutant Release and Transfer Register (PRTR) data sets <https://www.gov.uk/guidance/uk-pollutant-release-and-transfer-register-prtr-data-sets>

Department for Environment, Food and Rural Affairs (Defra) (2009) Guidance on Assessing Emissions from Railway Locomotives, 10th February 2009, https://laqm.defra.gov.uk/documents/Railway_Locomotives_100209.pdf

Department for Transport, Road traffic statistics <https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints>

Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

Environment Agency, Pollution Inventory <https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory>

The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

Environmental Protection UK (EPUK)/ Institute of Air Quality Management (IAQM), (2017) Land-Use Planning & Development Control: Planning for Air Quality <https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

Greater Manchester Combined Authority/ Transport for Greater Manchester, Greater Manchester Air Quality Action Plan 2016-2021, https://www.manchester.gov.uk/downloads/download/4166/air_quality_reports

Greater Manchester Combined Authority (GMCA) reports, Clean Air Greater Manchester, <https://cleanairgm.com/gmca-reports/>

Greater Manchester Combined Authority (2023) 2022 Air Quality Annual Status Report (ASR), June 2023 https://assets.ctfassets.net/tlpgbv1k6h2/3eJDZpHcCKNK0ZO7TcUkl/3363e762b28868a832ab2200286a4841/Greater_Manchester_Air_Quality_Annual_Status_Report_2022.pdf

Greater Manchester Combined Authority (2021) Greater Manchester's Plan for Homes, Jobs and the Environment: Greater Manchester Spatial Framework Publication Plan 2020, Draft for Approval October 2020, <https://www.greatermanchester-ca.gov.uk/media/3663/221020-agma-issue-opt.pdf>

Greater Manchester Combined Authority (2021) Greater Manchester Places For Everyone. See: <https://www.greatermanchester-ca.gov.uk/what-we-do/planning-and-housing/places-for-everyone/submission-documents/>

Greater Manchester Combined Authority/ Transport for Greater Manchester, Greater Manchester Air Quality Action Plan 2016-2021, https://www.manchester.gov.uk/downloads/download/4166/air_quality_reports

Greater Manchester Combined Authority/ Transport for Greater Manchester, (2016) Greater Manchester Low-Emission Strategy, December 2016 <https://www.greatermanchester-ca.gov.uk/media/1276/low-emission-strategy-dec-2016.pdf>

HMSO (2021) Environment Act 2021, November 2021, <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

HMSO (1990) Environmental Protection Act 1990, Chapter 43, Part III Statutory Nuisances and Clean Air <https://www.legislation.gov.uk/ukpga/1990/43/part/III>

HMSO (1995). 'The Environment Act', Chapter 25, Part IV Air Quality London: HMSO

HMSO (2016). Statutory Instrument 2016 No. 1184, Environmental Protection, England, The Air Quality Standards (Amendment) Regulations 2016, London: HMSO, <https://www.legislation.gov.uk/uksi/2016/1184/contents/made>

HMSO (2010). Statutory Instrument 2010 No. 1001, The Air Quality Standards Regulations 2010, London: HMSO

Institute of Air Quality Management (IAQM) (2021), Indoor Air Quality Guidance: Assessment, Monitoring, Modelling and Mitigation, version 1.0, September 2021, https://iaqm.co.uk/wp-content/uploads/2013/02/iaqm_indoorairquality.pdf

Institute of Air Quality Management (IAQM) (2020) A guide to the assessment of air quality impacts on designated nature conservation sites, version 1.1, May 2020, <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf>

Institute of Air Quality Management (IAQM) (2014). Guidance on the assessment of dust from demolition and construction v1.1 <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

John Matthews Architects (2024) Prestwich Village Masterplan, Ground floor, Proposed site plan, Ref: 207-JMA-MP-00-DR-A-001400, Rev: P00, 16.01.24

John Matthews Architects (2024) Prestwich Village Masterplan, First floor, Proposed site plan, Ref: 207-JMA-MP-01-DR-A-001401, Rev: P00, 16.01.24

John Matthews Architects (2024) Prestwich Village Masterplan, Roof plan, Proposed site plan, Ref: 207-JMA-MP-RF-DR-A-001410, Rev: P00, 16.01.24

Manchester City Council (2022) Additional Planning Guidance, Environmental information for developers, August 2022 https://www.manchester.gov.uk/info/500207/planning_and_regeneration/1962/additional_planning_guidance/3

Ministry of Housing, Communities & Local Government (2021), National Planning Policy Framework, July 2021
<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Ministry of Housing, Communities and Local Government (2019) Planning Practice Guidance: Air Quality, updated 1 November 2019 <https://www.gov.uk/guidance/air-quality--3>

World Health Organisation (WHO) (2021) WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, <https://apps.who.int/iris/handle/10665/345329>.

11.0

Glossary

11.0 Glossary

Term/Acronym	Details
$\mu\text{g}/\text{m}^3$	Micrograms (one-millionth of a gram) per cubic metre of air
AADT	Annual average daily traffic
AQAL	Air Quality Assessment Level
AQAP	Air quality action plan
AQMA	Air quality management area. Areas where the air quality objectives are likely to be exceeded. Declared by way of an order issued under the Section 83(1) of the Environment Act 1995.
AQO	Air quality objective. Air quality targets to be achieved locally as set out in the Air Quality Regulations 2000 and subsequent Regulations. Objectives are expressed as pollution concentrations over certain exposure periods, which should be achieved by a specific target date. Some objectives are based on long term exposure (e.g. annual averages), with some based on short term objectives. Objectives only apply where a member of the public may be exposed to pollution over the relevant averaging time.
AQS	Air quality strategy
ASR	Annual status report
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
Earthworks	The process of soil stripping, ground-levelling, excavation and landscaping.
EFT	Emission Factor Toolkit
EU	European union
Exceedance	Concentrations of a specified air pollutant greater than the appropriate Air Quality Objective.
HDV	Heavy duty vehicle
IAQM	Institute of Air Quality Management
LA	Local authority
LAQM	Local air quality management
LAQM, TG	Local air quality management technical guidance
LDV	Light duty vehicle
Limit Values / EU limit values	The maximum pollutant levels set out in the EU Daughter Directives on Air Quality. In some cases, the limit values are the same as the national air quality objective but may allow a longer period for achieving.
LT	Long-term averaging period (i.e. Annual mean)
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
PCM	Pollution climate model
PM_{10}	The fraction of particulates in air of very small size (less than 10 micrometres).
$\text{PM}_{2.5}$	Fine particles in the (ambient) air 2.5 micrometres or less in size.
Ramsar/ Ramsar site	The Convention on Wetlands of International Importance, called the Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Ramsar sites are wetlands of international importance, designated under the Ramsar Convention.
SAC/ pSAC/ cSAC	Special area of conservation / potential SAC / candidate SAC
SPA / pSPA	Special protection area / potential special protection area
SPG	Supplementary planning guidance
SSSI	Site of special scientific interest
ST	Short-term averaging period (i.e. Daily, hourly, or 15-min means)

Term/Acronym	Details
TC	Transport Consultant
TEMPRO	Trip End Model Presentation Program
TP	Travel Plan
Trackout	The transfer of dust or dirt on the local road network and then re-suspended by vehicles on the network.
TS	Transport Statement

Table 11-1: Glossary

Appendices

Annex A – Air Quality Assessment Authors

Co-Author: **Annie Trevis**

Annie is a Senior Consultant in Cundall's Air Quality Team. She has 5 years' experience working in Air Quality and has previously worked in one other private consultancy. She is a Full Member of the Institution of Environmental Sciences and the Institute of Air Quality Management.

She is experienced in undertaking air quality assessments for a range of developments in numerous sectors, including air quality chapters for Environmental Impact Assessments. She is also fully conversant with atmospheric dispersion modelling through the use of ADMS and AERMOD software as part of more detailed air quality assessments.

She has completed air quality and dust management plans for a variety of developments.

She has undertaken and been the project manager for numerous dust and air quality monitoring programs for a wide range of projects across the UK, Denmark and Germany.

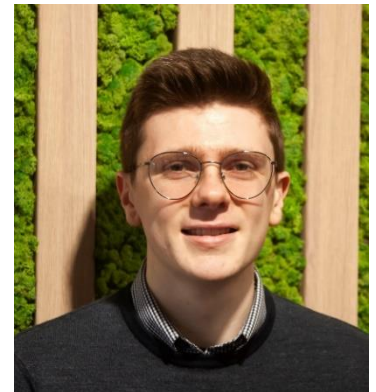


Co-Author: **Thomas Vaughan**

Thomas is a Graduate Air Quality Consultant with Cundall, having joined the company in 2022. Thomas is an Associate Member of the Institute of Air Quality Management (IAQM) and the Institution of Environmental Sciences (IES).

He has an MSc degree in Environment and Development from Lancaster University, which examined sustainable development practices, atmospheric greenhouse gas modelling, climate change and the Earth system, environmental impact assessments and data assimilation techniques. He also has a BSc in Physics with Astronomy from the University of Surrey, which included electromagnetism, waves and oscillations, equations of gases, nuclear physics and computational modelling.

He has experience in atmospheric data processing and modelling, geographical information systems (GIS) and ADMS dispersion modelling.



Reviewer: **Glyn Hodgkiss**

Glyn is an Associate in Cundall's Air Quality Team. He has 30 years' experience working in the environmental field and has specialised in Air Quality for over 15 years. He is a Chartered Environmentalist and Member of the Institute of Air Quality Management.

Working in both the private and public sectors, Glyn has gained extensive experience in monitoring and modelling air quality. His role in Local Government included air quality action planning, working with developers to minimise air quality impacts of new development, working on regional planning policy initiatives and on the delivery of government funded air quality improvement programs. He has also worked in private sector consultancy on the delivery of multiple air quality assessments ranging from small, single source dispersion modelling studies through to complex multi-source assessments and major road and infrastructure projects. This work has provided valuable support in the design, planning, construction and operation of new developments.

Glyn has a pedigree in collaborative working, bringing together the expertise of Cundall alongside other consultants and stakeholders to promote smooth project progression from inception to conclusion.



Annex B – Consultation with Bury Council

From: Jones, Rebecca (Environmental Protection) <[REDACTED]> **On Behalf Of** envsection
Sent: 23 August 2023 11:21
To: Annie Trevis <[REDACTED]>; envsection <[REDACTED]>
Cc: Scott, Judith <[REDACTED]>
Subject: RE: Prestwich Village - Air Quality

Annie,

Using 2022 as the base year appears reasonable.

Thanks,

Rebecca.

Rebecca Jones
Environmental Protection Officer
Department of Operations
[REDACTED]
[REDACTED]



Follow us on



From: Annie Trevis <[REDACTED]>
Sent: Wednesday, August 23, 2023 8:57 AM
To: envsection [REDACTED]>
Subject: RE: Prestwich Village - Air Quality

Hello,

Just forwarding on the below as Judith is on leave, can anyone else advise in her absence?

Kind regards,

Annie Trevis
Senior Air Quality Consultant
[Cundall](#)

Fourways House, 57 Hilton St, Manchester M1 2EJ, United Kingdom
D
T [REDACTED]
www.cundall.com | [People](#) | [Ideas](#) | [Projects](#) | [Twitter](#) | [Linkedin](#) | [Join](#)

From: Annie Trevis
Sent: 23 August 2023 08:54
To: Scott, Judith <[REDACTED]>
Subject: RE: Prestwich Village - Air Quality

Hi Judith,

Thanks for your response, I am just starting on the modelling now and wanted to get your agreement on the baseline (verification) year. Up until fairly recently we have been sticking with 2019 due to Covid-19 impacts, but now 2022 monitoring data is available, I suggest we model 2022 as our base year using this data along with 2022 traffic data (to be provided by the project transport consultant/DfT count points)? Would this be acceptable?

Kind regards,

Annie Trevis
Senior Air Quality Consultant
[Cundall](#)

Fourways House, 57 Hilton St, Manchester M1 2EJ, United Kingdom
D
T + [REDACTED]
www.cundall.com | [People](#) | [Ideas](#) | [Projects](#) | [Twitter](#) | [Linkedin](#) | [Join](#)

From: Scott, Judith <[REDACTED]>
Sent: 14 August 2023 14:38
To: 'Annie Trevis' <[REDACTED]>
Subject: RE: Prestwich Village - Air Quality

Hi Annie

Thank you for your response.

I'm not clear what the value of the AADT is but from the information you have provided it appears that a detailed air quality risk assessment, to include dispersion modelling is required. As the creation of the multi-storey car park will create a more concentrated source of air pollution this will need to be considered in relation to the nearby sensitive receptors.

I hope this helps, please contact me if you require anything further.

Many thanks

Regards

Judith Scott

Environmental Protection Officer

Department of Operations



Follow us on



From: Annie Trevis <[REDACTED]>
Sent: Monday, August 14, 2023 9:36 AM
To: Scott, Judith <[REDACTED]>
Subject: RE: Prestwich Village - Air Quality

Hi Judith,

Apologies for the delay in getting back to you, I was liaising with the project team to get the info you requested, please see answers below. There was a slight miscommunication on the AADT estimate I provided in my original email, this was actually the extra traffic forecast to be generated during a single peak hour period. Given the information below and the location of the site in relation to the AQMA, please can you advise if you would like detailed dispersion modelling carried out for future and nearby sensitive receptors? Would you like this to include consideration of the multi-storey car park as a specific emissions source in any modelling we do undertake?

If you have any more questions, please let me know.

Kind regards,

Annie Trevis

Senior Air Quality Consultant

Cundall

Fourways House, 57 Hilton St, Manchester M1 2EJ, United Kingdom

D

T + [REDACTED]

www.cundall.com | [People](#) | [Ideas](#) | [Projects](#) | [Twitter](#) | [Linkedin](#) | [Join](#)

From: Scott, Judith <[REDACTED]>
Sent: 07 August 2023 10:22
To: Annie Trevis <[REDACTED]>
Subject: RE: Prestwich Village - Air Quality

Hi Annie

Please could we have some clarification of the following point:

- Screening for the need for detailed assessment of operational impacts in accordance with the land-use planning guidance published by Environmental Protection UK (EPUK)/Institute of Air Quality Management (IAQM). The proposed development will result in a change of 60-70 AADT when compared to the existing traffic flows at the site, so we initially propose that **detailed dispersion modelling of operational traffic is not carried out – please advise if you agree?** However, a new multi-storey car park is proposed as part of the development, **please advise if this requires a detailed modelling assessment?**

Please provide the following:

- (i) Details of how the change in AADT has been calculated. **Yet to be calculated but AADT increase as a result of the development is likely to be >100.**
- (ii) What is the additional parking provision being provided by the multi storey car park? **Approx. 350 spaces. The travel hub/multi-storey car park represents a consolidation of existing parking in the town centre, from approx. 359 spaces in the Fairfax Road Car Park and the Longfield Centre Car Park, to 350 spaces in the travel hub.**
- (iii) What is the total additional parking provision for the scheme? **Fairfax Road Car Park (182 spaces) and the Longfield Centre Car Park (169 spaces) = 351 spaces. So therefore, the new scheme has a comparable number of spaces, but they will be arranged over a smaller area and multiple storeys. There will also be some surface level car parking at the community hub and for some of the residential plots. This will be limited. There will be approx. 25 of these spaces.**

Please let me know if you have any queries.

Many thanks

Regards

Judith Scott
Environmental Protection Officer
Department of Operations

Bury
Council

Follow us on



From: Annie Trevis <[REDACTED]>
Sent: Friday, July 21, 2023 9:32 AM
To: envsection <[REDACTED]>
Subject: Prestwich Village - Air Quality

Hello,

Cundall are providing input to the EIA for the proposed Prestwich Village development, which consists of a hybrid planning application for a mixed-use development in Prestwich Town Centre, known as Prestwich Village (M25 1AY). The site's western boundary is located within Bury's Air Quality Management Area (AQMA).

The site comprises a mixture of surface level car parking and retail units, including the Longfield Centre. The publicly accessible car parking consists of the Fairfax Road (Prestwich) Car Park (182 spaces), and the Longfield Centre Car Park (169) spaces. The site is bound by Rectory Lane to the east and south; retail units and Bury New Road to the west; and retail units and residential dwellings to the north. The location is shown below.



We propose the following scope of works for the Air Quality Assessment/ES chapter:

- Examination of project plans, online maps and aerial photographs.
- A review of legislation, national, regional and local policy and planning guidance related to air quality.
- Baseline assessment to establish likely air quality conditions in the vicinity of the site. This will include consideration of pollutant concentrations taken from Defra's latest background pollution maps, Local Authority monitoring data and LAEI data as appropriate and available, and also a review of surrounding industrial activities which may impact on the sites.
- Assessment of construction impacts in accordance with the Institute of Air Quality Management (IAQM) guidance.
- Screening for the need for detailed assessment of operational impacts in accordance with the land-use planning guidance published by Environmental Protection UK (EPUK)/Institute of Air Quality Management (IAQM). The proposed development will result in a change of 60-70 AADT when compared to the existing traffic flows at the site, so we initially propose that **detailed dispersion modelling of operational traffic is not carried out – please advise if you agree?** However, a new multi-storey car park is proposed as part of the development, **please advise if this requires a detailed modelling assessment?**
- The proposed development will have no combustion sources and heating and hot water will be all electric. Given this, we propose to scope out any further detailed assessment of combustion plant emissions.

- Recommendation of relevant mitigation measures, as required, in line with IAQM/EPUK guidance and other relevant planning guidance.
- Provision of an Air Quality Assessment Report/ES chapter for inclusion within the EIA.

If you disagree with any elements of the proposed scope, please let us know, otherwise we will proceed with the assumption it is acceptable.

Please forward on this email if needed, thanks for your help.

Annie Trevis

Senior Air Quality Consultant

Cundall

Fourways House, 57 Hilton St, Manchester M1 2EJ, United Kingdom

D

T + [REDACTED]

www.cundall.com | [People](#) | [Ideas](#) | [Projects](#) | [Twitter](#) | [Linkedin](#) | [Join](#)

Annex C – IAQM Construction Assessment Methodology

Screening (Step 1)

As 'human receptors' were identified within 350 m of the boundary of the site; and within 50 m of the route(s) to be used by construction vehicles on the public highway, up to 500 m from the site entrance, a detailed risk assessment was undertaken.

Dust Emission (Step 2A)

The potential dust emission magnitude for different activities have been defined based on the criteria listed in Table C-1.

Stage	Description	Large	Medium	Small
Demolition	Definitions for demolition are:	1. Total building volume >50,000 m ³ 2. Potentially dusty construction material (e.g., concrete) 3. On-site crushing and screening 4. Demolition activities >20 m above ground level	5. Total building volume 20,000 m ³ – 50,000 m ³ 6. Potentially dusty construction material (e.g., concrete) 7. Demolition activities 10 – 20 m above ground level	8. Total building volume <20,000 m ³ 9. Construction material with low potential for dust release (e.g., metal cladding or timber) 10. Demolition activities <10 m above ground, demolition during wetter months
Earthworks	Earthworks will primarily involve excavating material, haulage, tipping, and stockpiling. This may also involve levelling the site and landscaping.	11. Total site area >10,000 m ² 12. Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size) 13. >10 heavy earth moving vehicles active at any one-time formation of bunds >8 m in height 14. Total material moved >100,000 tonnes	15. Total site area 2,500 m ² – 10,000 m ² 16. Moderately dusty soil type (e.g., silt) 17. 5-10 heavy earth moving vehicles active at any one-time formation of bunds 4 m – 8 m in height 18. Total material moved 20,000 tonnes – 100,000 tonnes	19. Total site area <2,500 m ² 20. Soil type with large grain size (e.g., sand) 21. <5 heavy earth moving vehicles active at any one-time formation of bunds <4 m in height 22. Total material moved <20,000 tonnes, earthworks during wetter months
Construction	The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s) / infrastructure, method of construction, construction materials, and duration of build.	23. Total building volume >100,000 m ³ 24. On-site concrete batching and sandblasting	25. Total building volume 25,000 m ³ – 100,000 m ³ 26. Potentially dusty construction material (e.g., concrete) 27. On-site concrete batching	28. Total building volume <25,000 m ³ 29. Construction material with low potential for dust release (e.g., metal cladding or timber)

Stage	Description	Large	Medium	Small
Trackout	Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology, and duration. Only receptors within 50 m of the routes used by vehicles on the public highway and up to 500 m from the site entrances are considered to be at risk from the effects of dust.	30. >50 HDV (>3.5 tonnes) outward movements in any one day 31. Potentially dusty surface material (e.g., high clay content) 32. Unpaved road length >100 m	33. 10-50 HDV (>3.5 tonnes) outward movements in any one day 34. Moderately dusty surface material (e.g., high clay content) 35. Unpaved road length 50 m – 100 m	36. <10 HDV (3.5 tonnes) outward movements in any one day 37. Surface material with low potential for dust release 38. Unpaved road length <50 m

Table C-1: Potential Dust Emission Magnitude Criteria

Sensitivity of the Area (Step 2B)

The sensitivity of the area takes account of several factors:

1. The specific sensitivities of receptors in the area.
2. The proximity and number of those receptors.
3. In the case of PM₁₀, the local background concentration; and
4. Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table C-2 provides guidance on the sensitivity of different types of receptors.

Description	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of People to Dust Soiling Effects	1. Users can reasonably expect enjoyment of a high level of amenity 2. The appearance, aesthetics, or value of their property would be diminished by soiling 3. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land 4. Indicative examples include dwellings, museums, and other culturally important collections, medium, and long-term car parks, and car showrooms	5. Users would expect a to enjoy a reasonable level of amenity, but would not reasonably expect a to enjoy the same level of amenity as in their home 6. The appearance, aesthetics, or value of their property could be diminished by soiling 7. The people or property wouldn't reasonably be expected a to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land 8. Indicative examples include parks and places of work	9. The enjoyment of amenity would not reasonably be expected; or 10. Property would not reasonably be expected a to be diminished in appearance, aesthetics, or value by soiling 11. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land 12. Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks, and roads

Description	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of People to the Health Effects of PM₁₀	13. Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) 14. Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment	15. Locations where the people exposed are workers and, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). 16. Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation	17. Locations where human exposure is transient. 18. Indicative examples include public footpaths, playing fields, parks, and shopping streets
Sensitivities of Receptors to Ecological Effects	19. Locations with an international or National designation and the designated features may be affected by dust soiling 20. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain 21. Indicative examples include a Special Area of Conservation designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings	22. Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown 23. Locations with a National designation where the features may be affected by dust deposition 24. Indicative example is a Site of Special Scientific Interest with dust sensitive features	25. Locations with a local designation where the features may be affected by dust deposition. 26. Indicative example is a local Nature Reserve with dust sensitive features

Table C-2: Sensitivities of People to Dust Soiling Effects, Health Effects of PM₁₀, and Sensitivities of Receptors to Ecological Effects

Full details of the sensitivities of receptors are provided in the IAQM Guidance document.

Table C-3, Table C-4, and Table C-5 show how the sensitivity of the area has been determined for dust soiling, human-health, and ecosystem impacts respectively.

These tables take account of several factors which may influence the sensitivity of the area. The highest level of sensitivity from each table has been recorded.

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table C-3: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration (µg/m³)	Number of Receptors ^d	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table C-4: Sensitivity of the Area to Human-Health Impacts

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

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

Table C-5: Sensitivity of the Area to Ecological Impact

The highest level of sensitivity from each table has been recorded. Professional judgement has been used to determine alternative sensitivity categories with consideration of additional factors, such as any pre-existing screening between the source and the receptors, the season during which the works will take place, and duration of the potential impact.

Risk of Impact Definition

The dust emission magnitude (Step 2A) was combined with the sensitivity of the area (Step 2B) to determine the risk of impact with no mitigation applied. Tables C-6 to C-9 provide the method of assigning the level of risk of each activity and used to determine the level of site-specific mitigation.

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible

Table C-6: Risk of Impact – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table C-7: Risk of Impact – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table C-8: Risk of Impact – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Low risk	Negligible
Low	Low risk	Low risk	Negligible

Table C-9: Risk of Impact – Trackout

Annex D – EPUK/IAQM Local Air Quality Assessment Screening Criteria

Comparison Against EPUK/IAQM Criteria

EPUK/IAQM's guidance note 'Land-Use Planning & Development Control: Planning for Air Quality' (updated in January 2017) was issued to ensure that air quality is adequately considered in the land-use planning and developmental control process.

It provides a decision-making process which assists with the understanding of air quality impacts and implications because of development proposals. It provides a framework for air quality considerations within local development control processes, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant.

The guidance also provides some clarification as to when air quality constitutes a material consideration and highlights the links to other relevant issues (for example traffic speed reduction measure and the use of alternative technology to provide energy) and the importance of the understanding of these with the input from other discipline specialists. The 'creeping baseline' is another issue raised about cumulative impacts.

The guidance note is widely accepted as the most appropriate reference method for this purpose. This guidance refers to the Town and Country Planning (Development Management Procedure) Order (England) 2010 [(Wales) 2012] definition of a 'major' development when scoping assessments required for the planning process.

A 'major' development includes developments where:

- The number of dwellings is 10 or above;
- The residential development is carried out of a site of more than 0.5ha where the number of dwellings is unknown;
- The provision of more than 1,000m² commercial floor space; or,
- Development carried out on land of 1ha or more.

There are two types of air quality impacts to be considered:

- The impact of existing sources in the local area on the Proposed Development (governed by background pollutant levels and proximity to sources of air pollution); and,
- The impacts of the Proposed Development on the local area.

Regarding the changes in air quality or exposure to air pollution, the guidance indicates that each local authority will be likely to have their own view on the significance of this; these are to be described in relation to whether a National Air Quality Objective (NAQO) predicted to be met, or at risk of not being met. Exceedances of these objectives are considered as significant, if not mitigated.

As part of the impact of the Proposed Development on the local area, a two-staged assessment is recommended as per current guidance.

Stage 1: Determines whether an air quality assessment is required. In order to proceed to Stage 2, it requires any of the criteria under (A) coupled with any of the criteria under (B) in Table D-1 to apply.

Stage 2: Where an assessment is deemed appropriate, this may take the form of a Simple Assessment or a Detailed Assessment, using suitable guidance provided in Table D-2.

Criteria to Proceed to Stage 2

A. If any of the following apply:

- 10 or more residential units of a site area of more than 0.5ha
- More than 1,000m² of floor space for all other uses or a site area greater than 1ha

B. Coupled with any of the following:

- The development has more than 10 parking spaces
- The development will have a centralised energy facility or other centralised combustion process

Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

Table D-1: Stage 1 Criteria

The Development will	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: • More than 100 AADT within or adjacent to an Air Quality Management Area (AQMA) • More than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A Change of HDV flows of: • More than 25 AADT within or adjacent to an AQMA • More than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. Traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: • More than 25 AADT within or adjacent to an AQMA • More than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NO _x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing NO ₂ concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

Table D-2: Indicative Criteria for Requiring an Air Quality Assessment

Impact Descriptors for Individual Receptors

The EPUK/IAQM guidance contains a two Stage process for determining the likely significant effects of the impacts on air quality:

- A qualitative or quantitative description of the impacts on local air quality arising from the development; and
- A judgement on the overall significance of the effects of any impacts.

A framework for describing the impacts is set out in EPUK/IAQM guidance and summarised in Table D-3 below.

Long-term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Table D-3: Indicative Criteria for Requiring an Air Quality Assessment

For air quality impacts arising from surrounding sources on new occupants of a development, then the impacts are best described in relation to whether an air quality objective will not be met or is at risk of not being met. Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provisions is made to reduce their exposure by some means.

Changes of less than 0.5%, will be described as Negligible.

Annex E – Results of Screening Assessment

Where the Development will:	Indicative Criteria to Proceed to an Air Quality Assessment	Information Relevant to the Proposed Development
1. Cause a significant change in Light Duty Vehicle (LDV) traffic slows on local roads with relevant receptors.	EPUK/IAQM Guidance states a change of LDV flows of: - More than 100 AADT within or adjacent to an Air Quality Management Area (AQMA) - More than 500 AADT elsewhere.	The development will generate >100 daily vehicle trips, therefore further assessment of increased transport emissions was carried out using dispersion modelling to assess the potential impact on nearby receptors and predict concentrations at proposed on-site receptors.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A Change of HDV flows of: - More than 25 AADT within or adjacent to an AQMA - More than 100 AADT elsewhere.	No significant increase in HDV flows is predicted
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA	No realignment of >5m proposed
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. Traffic lights, or roundabouts.	No new junctions proposed
5. Introduce or change a bus station.	Where bus flows will change by: - More than 25 AADT within or adjacent to an AQMA - More than 100 AADT elsewhere.	No bus station proposed
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	No underground car parking proposed
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.	Typically, any combustion plant where the single or combined NO _x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion.	Heating and cooling provision for the development will be provided by air source heat pumps powered by electricity. If there is a requirement for any back-up/standby diesel generators, it is assumed that these units will be operational for less than 50 hours per year. Consideration would need to be made regarding the placement of the flue to achieve a suitable separation distance from any air intakes or openable windows. Based on these conditions, the emissions are not anticipated to be significant.

Table E-1: Indicative Criteria for Requiring a Detailed Air Quality Assessment

Annex F – Model Input Data

The traffic data used in the modelling is listed in Table F-1 and the location of these modelled roads are shown in Figure F-1.



Figure F--1: Modelled Roads

Link	Road	Road Width (m)	Estimated Speed (kph)	Baseline 2022		2031 DM		2031 DS	
				24hr AADT	% HGV	24hr AADT	% HGV	24hr AADT	% HGV
1a	Fairfax Rd	7.0	20	6955	0.8	6955	0.8	7426	0.7
1b	Fairfax Rd	7.0	20	6955	0.8	6955	0.8	7426	0.7
1c	Fairfax Rd	7.0	20	6955	0.8	6955	0.8	7426	0.7
1d	Fairfax Rd	7.0	20	6955	0.8	6955	0.8	7426	0.7
1e	Fairfax Rd	7.0	20	6955	0.8	6955	0.8	7426	0.7
1f	Fairfax Rd	9.0	20	6955	0.8	6955	0.8	7426	0.7
2a	Poppythorn Lane	7.0	48.3	3910	0.2	3910	0.2	3938	0.2
3a	Heys Rd	6.5	48.3	3380	0.8	3380	0.8	3411	0.8
3b	Heys Rd	6.5	32.2	3380	0.8	3380	0.8	3411	0.8
4a	A56	16.5	20	14852	4.7	14852	4.7	15138	4.6
4b	A56	8.5	20	14852	4.7	14852	4.7	15138	4.6
4c	A56	8.0	48.3	14852	4.7	14852	4.7	15138	4.6
4d	A56	8.2	25	14852	4.7	14852	4.7	15138	4.6
4e	A56	9.5	48.3	14852	4.7	14852	4.7	15138	4.6
4f	A56	7.5	48.3	14852	4.7	14852	4.7	15138	4.6
4g	A56	7.5	25	14852	4.7	14852	4.7	15138	4.6
4h	A56	7.2	48.3	14852	4.7	14852	4.7	15138	4.6
5a	A56	15.5	20	22572	3.5	22572	3.5	22643	3.5
5b	A56	14.0	48.3	22572	3.5	22572	3.5	22643	3.5
5c	A56	7.5	48.3	11286	3.5	11286	3.5	11322	3.5
5d	A56	8.0	48.3	11286	3.5	11286	3.5	11322	3.5
5e	A56	7.5	20	11286	3.5	11286	3.5	11322	3.5
5f	A56	9.0	20	11286	3.5	11286	3.5	11322	3.5
6a	Rectory Lane	7.0	20	2939	0.9	2939	0.9	2972	0.9
6c	Rectory Lane	9.0	32.2	2939	0.9	2939	0.9	2972	0.9
6b	Rectory Lane	7.0	32.2	2939	0.9	2939	0.9	2972	0.9
7a	Highfield Road	7.5	20	1216	0.0	1216	0.0	1243	0.0
8a	Chester Street	7.0	20	1570	0.6	1570	0.6	1580	0.6
8b	Chester Street	7.0	32.2	1570	0.6	1570	0.6	1580	0.6
Notes: The 2031 traffic flows provided by the project transport consultant are identical to the 2022 baseline flows. This is due to the agreement with Bury Council to exclude any future year traffic growth.									

Table F-1: Modelled Traffic Data

The input parameters for the car park modelling is included in Table F-2 and Table F-3 and the location of these modelled areas and volume sources are shown in Figure F-2 and Figure F-3.

Input parameter	Input data
Vehicle emissions*	
NO _x	0.425 g/km
PM ₁₀	0.020 g/km
PM _{2.5}	0.034 g/km
Cold start emission factor**	
NO _x	0.045 g/trip petrol, 0.325 g/trip diesel
PM ₁₀	0.022 g/trip diesel
PM _{2.5}	0.022 g/trip diesel
Hot exhaust emission factor**	
NO _x	0.067 g/km petrol, 0.579 g/km diesel
PM ₁₀	0.001 g/km petrol, 0.007 g/km diesel
PM _{2.5}	0.001 g/km petrol, 0.007 g/km diesel
Notes: *Emission factors in g/km generated from Emission Factor Toolkit v11.0, based on 2022 and speeds of 5kph. **Cold start emission factors (g/trip) and hot exhaust emission factors (g/km) from the NAEI database.	

Table F-2: Car park emissions calculations input data

Input parameter	Existing Surface Car Park		Proposed Travel Hub			
	Area 1	Area 2	Area 1 (top storey)	Area 2 (top storey)	Volume 1	Volume 2
Source area/volume	1,045m ²	3,159m ²	1,512m ²	1,204m ²	10,866m ³	7,946m ³
Assumed exhaust height	0.3m	0.3m	7.5m	6.9m	-	-
Average distance travelled*	25m	120m	80m	100m	80m	100m
Calculated total emission rates						
NO _x	1.24E-07	1.50E-07	2.36E-07	3.17E-07	4.67E-08	9.39E-08
PM ₁₀	6.68E-09	7.26E-09	1.18E-08	1.56E-08	2.34E-09	4.62E-09
PM _{2.5}	7.15E-09	8.99E-09	1.40E-08	1.89E-08	2.77E-09	5.60E-09
Notes: Car park areas were split into sections as appropriate to allow accurate representation in the model. The top floor of the Travel Hub was represented by area sources. Parking areas allocated to EV charging were not included as a source of emissions. *Distance travelled based on distance from entrance/exit to centre of the car park and also multiplied by the number of car park storeys in the case of the Travel Hub.						

Table F-3: Car park model input data

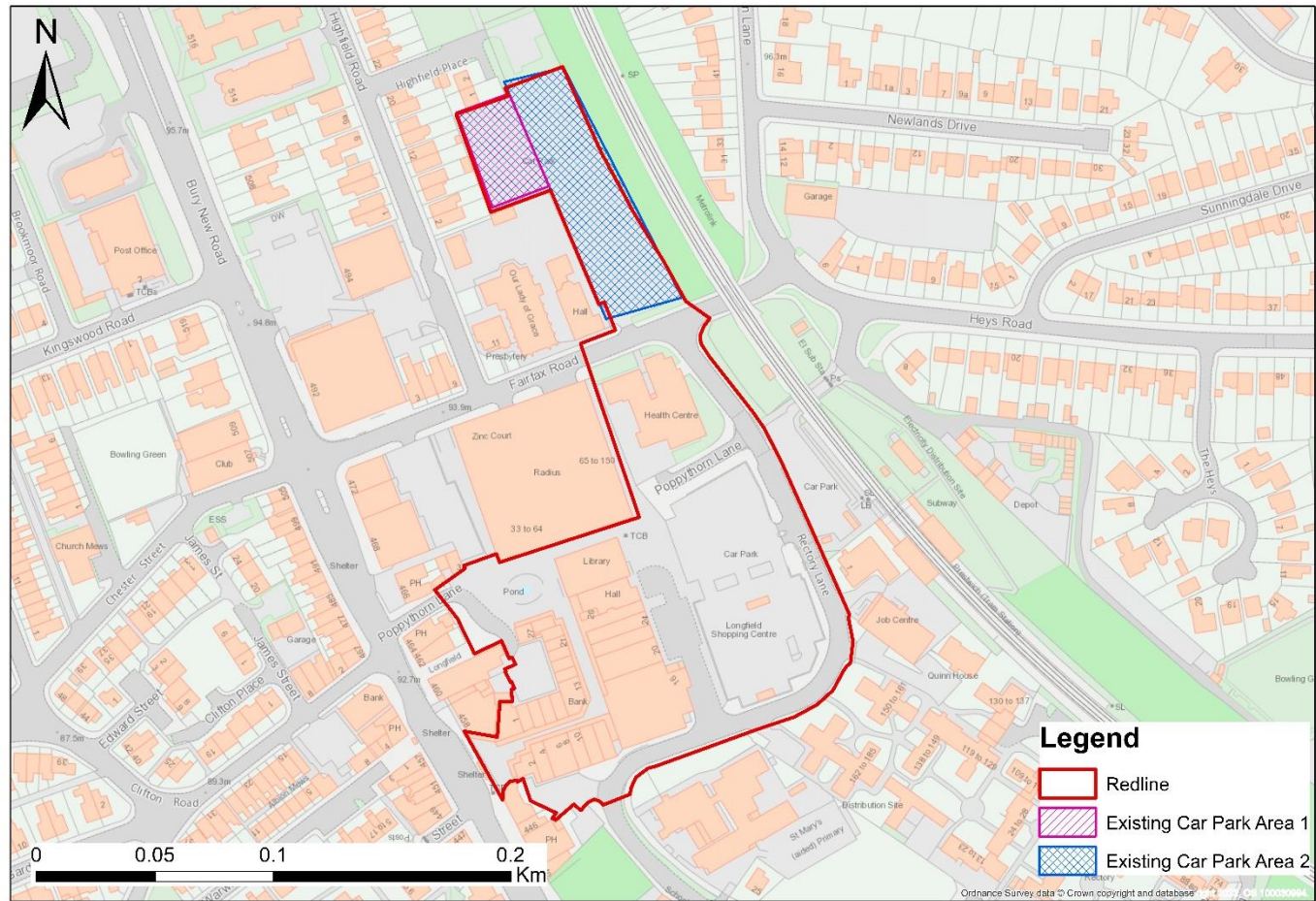


Figure F-2 Modelled Car Parks – Existing

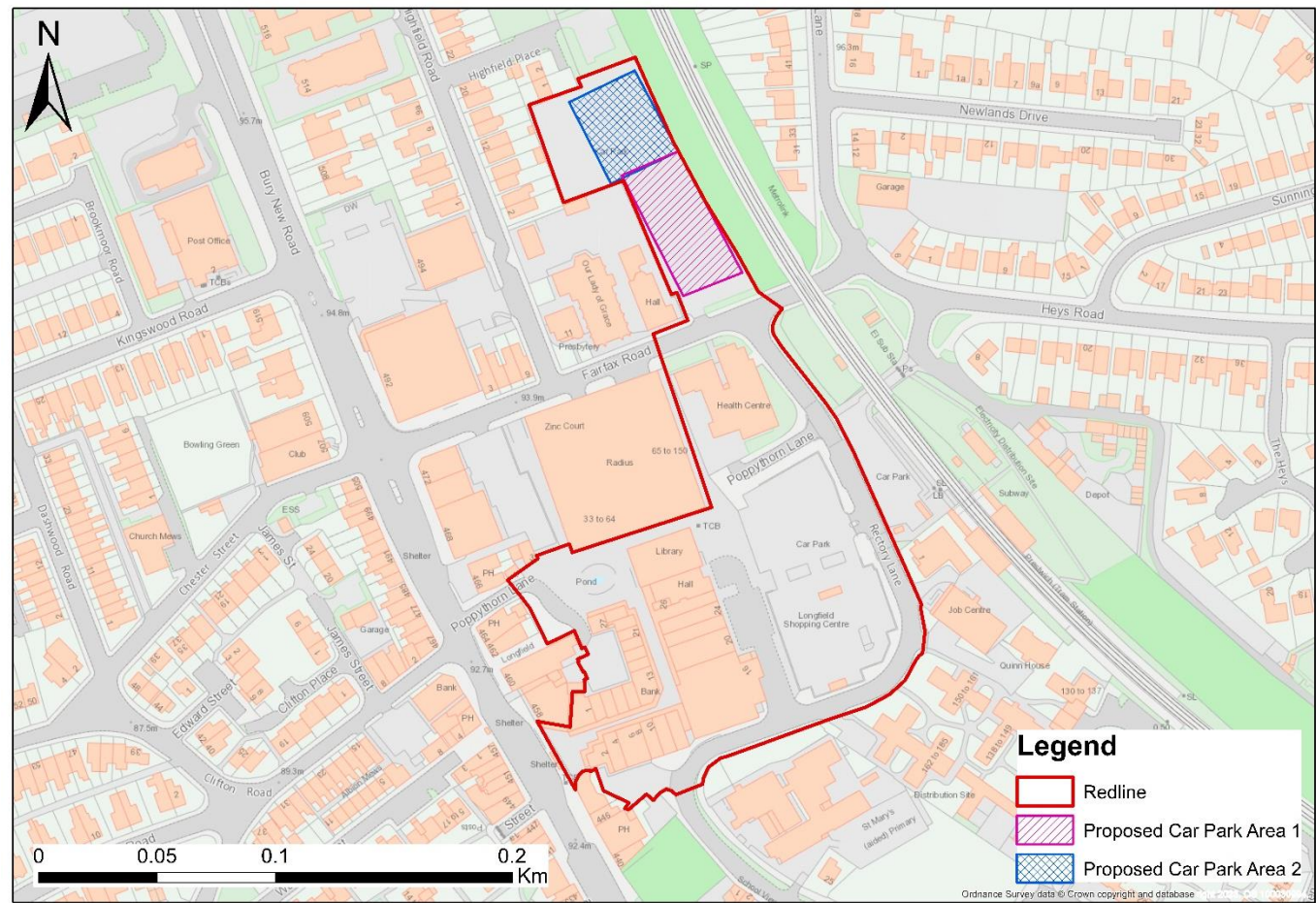


Figure F-3: Modelled Car Parks – Proposed

Annex G – Model Verification

Model Verification

Model verification is the process of comparing monitored and modelled pollutant concentrations for the same year, at the same locations, and adjusting modelled concentrations wherever necessary to be consistent with monitoring data. This increases the robustness of modelling results.

Discrepancies between modelled and measured concentrations can arise for a number of reasons, for example:

- Traffic data uncertainties
- Background concentration estimates
- Meteorological data uncertainties
- Sources not explicitly included within the model, for example car parks and bus stops
- Overall model limitations, including treatment of roughness and meteorological data, treatment of speeds), and:
- Uncertainty in monitoring data, particularly diffusion tubes

Verification is the process by which uncertainties such as those described above are investigated and minimised. Disparities between modelling and monitoring results are likely to arise as result of a combination of all of these aspects.

Using the guidance provided in Chapter 7 of LAQM (TG22), the modelled output has been verified against Local Authority monitoring data at roadside locations closest to the Proposed Development.

The performance of the dispersion model was assessed by comparing the modelled concentrations with measured concentrations. Meteorological data, monitored concentrations, vehicle emission rates and traffic data for 2022 were all used in the model verification process. The verification sites used are shown in Figure G-1.



Figure G-1: Verification Sites

The model adjustment was undertaken using methodology which requires the determination of the ratio between the measured and modelled road contributed NO_x at each comparison site. The ratio between them, referred to as the adjustment factor, is applied to the modelled road contributed NO_x . The modelled NO_2 is then determined using the Defra NO_x/NO_2 calculator.

Table G-1 presents a summary of the model performance prior to bias adjustment. The model verification is based on Defra EFT v11.0 emission factors.

Site ID	Location		Monitored NO_2 ($\mu\text{g}/\text{m}^3$)	Modelled NO_2 ($\mu\text{g}/\text{m}^3$)	% Difference (Modelled-Measured) / Measured
	X	Y			
CAP_BURY_003	381085	404275	36.2	23.1	-36.2%
CAP_BURY_021	381118	404192	33.2	24.0	-27.7%
CAP_BURY_001	381138	404194	34.6	28.3	-18.4%
CAP_BURY_022	381105	404279	28.2	24.9	-11.7%
BURY 17	381105	404279	28.6	24.8	-13.2%

Table G-1: Model Performance Prior To Bias Adjustment

Should the model results for NO_2 be mostly within $\pm 25\%$ of the measured values and there is no systematic over or under-prediction of concentrations, then the LAQM (TG22) guidance advises that no adjustment is necessary. The comparison between monitored and modelled showed that % difference was greater than 25% at two sites. The model underpredicted annual mean concentrations of NO_2 at all sites, and therefore as a conservative approach, model verification was carried out. An adjustment factor was calculated using Defra background NO_2 concentrations and applied in all scenarios, in accordance with the methodology prescribed in LAQM (TG22). A

regression analysis was undertaken of modelled and measured road NO_x concentrations at these locations. The derived adjustment factor (2.150) was then applied to the modelled road NO_x concentrations to adjust for model bias. The comparison of modelled with measured values was then repeated and the results are shown in Table G-2.

Site ID	Location		Monitored NO ₂ (µg/m ³)	Modelled NO ₂ (µg/m ³)	% Difference (Modelled-Measured) / Measured
	X	Y			
CAP_BURY_003	381085	404275	36.2	27.1	-25.1%
CAP_BURY_021	381118	404192	33.2	29.0	-12.7%
CAP_BURY_001	381138	404194	34.6	37.6	8.5%
CAP_BURY_022	381105	404279	28.2	30.8	9.1%
BURY 17	381105	404279	28.6	30.6	7.1%

Table G-2: Model Performance After Adjustment

The accuracy of the adjusted model was also considered via the calculation of the Root Mean Square Error (RMSE) and fractional bias.

With the unadjusted model results, the RMSE was 8.028µg/m³, while with the adjusted model results this was reduced to 4.896µg/m³ so the adjustment has reduced the average error or uncertainty in the model results. LAQM (TG22) states that ideally, an RMSE within 10% of the air quality objective would be derived, which equates to 4µg/m³ for the annual average NO₂ objective. The RMSE is slightly above 4µg/m³, however, the model results are within 25% of the monitored values and therefore considered robust.

The fractional bias was 0.250 with the unadjusted model, which shows a tendency to under-predict, and 0.036 with the adjusted model, which shows that the under prediction has been mostly removed.

The final adjusted total NO₂ concentration predicted at the diffusion tubes sites is within ±25% of the measured values and is therefore considered satisfactory.

In accordance with Defra guidance, the road contributed NO_x adjustment factor was also applied to the road contributed PM concentration. The total PM₁₀ and PM_{2.5} concentrations are derived by adding the adjusted road contribution value to the Defra background concentrations.

Annex H – Dispersion Modelling Results

Long-Term NO₂ Concentrations - Operation Phase Road Traffic Emissions

Predicted NO₂ concentrations at the existing and proposed receptors are presented in Table H-1.

Results are presented for the following scenarios:

Worst-case scenario (use of 2023 emissions):

- Do-minimum (DM) with 2031 traffic flows without the Proposed Development in place and with 2022 backgrounds.
- Do-something (DS) with 2031 traffic flows with the Proposed Development in place and with 2022 backgrounds.

Realistic scenario (use of 2031 emissions):

- Do-minimum (DM) with 2031 traffic flows without the Proposed Development in place and with 2022 backgrounds.
- Do-something (DS) with 2031 traffic flows with the Proposed Development in place and with 2022 backgrounds.

Receptor ID	Location		Height (m)	Annual Mean NO ₂ Concentrations µg/m³					
				2022 Background with 2031 traffic flows and 2023 Emissions			2022 Background with 2031 traffic flows and 2031 Emissions		
	X	Y		DM	DS	Impact	DM	DS	Impact
Existing Receptors									
R1	381331.3	404256.1	1.5	22.5	22.5	Negligible	20.8	21.0	Negligible
R2	381365.7	404229.0	4.5	22.0	22.0	Negligible	20.6	20.7	Negligible
R3	381296.0	404195.6	1.5	24.7	24.4	Negligible	21.6	21.8	Negligible
R4	381225.2	404170.0	4.5	23.3	23.1	Negligible	21.1	21.2	Negligible
R5	381215.7	404178.7	4.5	24.2	24.0	Negligible	21.5	21.6	Negligible
R6	381204.5	404245.7	1.5	22.8	22.8	Negligible	20.9	21.1	Negligible
R7	381129.6	404144.0	4.5	23.4	23.4	Negligible	21.3	21.3	Negligible
R8	381141.0	404136.6	4.5	24.2	24.1	Negligible	21.6	21.7	Negligible
R9	381171.4	404071.8	4.5	23.3	23.3	Negligible	21.2	21.3	Negligible
R10	381234.9	403961.4	4.5	18.7	18.7	Negligible	16.9	16.9	Negligible
R11	381340.3	403767.7	1.5	19.2	19.2	Negligible	17.1	17.1	Negligible
R12	381281.0	403909.8	4.5	20.2	20.2	Negligible	17.6	17.6	Negligible
R13	381374.8	403921.8	1.5	17.9	17.9	Negligible	16.5	16.5	Negligible
R14	381340.4	404025.6	1.5	21.4	21.4	Negligible	20.3	20.4	Negligible
R15	381362.3	404036.9	1.5	21.3	21.3	Negligible	20.3	20.3	Negligible
R16	381083.5	404376.0	1.5	24.7	24.7	Negligible	21.9	21.9	Negligible
R17	381124.7	404260.8	1.5	26.7	26.7	Negligible	22.8	22.9	Negligible
R18	381262.0	404236.5	1.5	22.0	22.2	Negligible	20.6	21.0	Negligible
R19	381224.8	404258.9	1.5	21.8	21.9	Negligible	20.5	20.8	Negligible
R20	381220.3	404270.9	1.5	21.7	21.9	Negligible	20.5	20.8	Negligible
R21	381215.7	404283.0	1.5	21.6	21.8	Negligible	20.4	20.7	Negligible
R22	381212.3	404293.0	1.5	21.5	21.7	Negligible	20.4	20.7	Negligible
R23	381224.0	404298.0	1.5	21.3	21.7	Negligible	20.3	20.8	Negligible

Receptor ID	Location		Height (m)	Annual Mean NO ₂ Concentrations µg/m³					
				2022 Background with 2031 traffic flows and 2023 Emissions			2022 Background with 2031 traffic flows and 2031 Emissions		
	X	Y		DM	DS	Impact	DM	DS	Impact
Proposed Receptors									
PR1	381335.8	404145.8	1.5	-	21.7	-	-	20.5	-
PR2	381367.8	404062.3	1.5	-	22.5	-	-	20.9	-

Table H-1: NO₂ Annual Mean Concentrations at Modelled Receptors During the Operation Phase

There are no exceedances of the annual mean objective at any receptors in the 2023 or 2031 DM or DS future scenarios. The maximum predicted concentration for the existing receptors is 26.7 µg/m³ and for the proposed receptors is 22.5 µg/m³, which are below the annual mean objective (40 µg/m³). These worst-case concentrations are based on the retaining emissions at current year (2023 emissions). In the more realistic scenario, using 2031 emissions, the maximum predicted concentrations are 22.9 µg/m³ for the existing receptors and 20.9 µg/m³ for the proposed receptors, which are below the annual mean objective (40 µg/m³).

The predicted impact of the Proposed Development on all modelled receptors is negligible.

As all concentrations are well below 60 µg/m³ in all scenarios, exceedances of the short-term NO₂ objective are considered to be unlikely.

Long Term PM₁₀ Concentrations: Operation Phase Road Traffic Emissions

Predicted PM₁₀ concentrations at the existing and proposed receptors are presented in Table H-2.

Receptor ID	Location		Height (m)	Annual Mean PM ₁₀ Concentrations µg/m³					
				2022 Background with 2031 traffic flows and 2023 Emissions			2022 Background with 2031 traffic flows and 2031 Emissions		
	X	Y		DM	DS	Impact	DM	DS	Impact
Existing Receptors									
R1	381331.3	404256.1	1.5	14.3	14.3	Negligible	14.3	14.3	Negligible
R2	381365.7	404229.0	4.5	14.2	14.2	Negligible	14.2	14.2	Negligible
R3	381296.0	404195.6	1.5	14.8	14.7	Negligible	14.6	14.6	Negligible
R4	381225.2	404170.0	4.5	14.4	14.4	Negligible	14.3	14.4	Negligible
R5	381215.7	404178.7	4.5	14.6	14.6	Negligible	14.5	14.5	Negligible
R6	381204.5	404245.7	1.5	14.3	14.3	Negligible	14.3	14.3	Negligible
R7	381129.6	404144.0	4.5	14.4	14.4	Negligible	14.4	14.4	Negligible
R8	381141.0	404136.6	4.5	14.6	14.6	Negligible	14.5	14.5	Negligible
R9	381171.4	404071.8	4.5	14.4	14.4	Negligible	14.3	14.4	Negligible
R10	381234.9	403961.4	4.5	12.6	12.6	Negligible	12.6	12.6	Negligible
R11	381340.3	403767.7	1.5	12.9	12.9	Negligible	12.9	12.9	Negligible
R12	381281.0	403909.8	4.5	13.1	13.1	Negligible	13.1	13.1	Negligible
R13	381374.8	403921.8	1.5	12.4	12.4	Negligible	12.4	12.4	Negligible
R14	381340.4	404025.6	1.5	14.0	14.0	Negligible	14.0	14.0	Negligible
R15	381362.3	404036.9	1.5	14.0	14.0	Negligible	14.0	14.0	Negligible
R16	381083.5	404376.0	1.5	15.0	15.0	Negligible	15.0	15.0	Negligible
R17	381124.7	404260.8	1.5	15.3	15.3	Negligible	15.3	15.3	Negligible
R18	381262.0	404236.5	1.5	14.1	14.2	Negligible	14.1	14.1	Negligible
R19	381224.8	404258.9	1.5	14.1	14.1	Negligible	14.1	14.1	Negligible
R20	381220.3	404270.9	1.5	14.1	14.1	Negligible	14.0	14.1	Negligible
R21	381215.7	404283.0	1.5	14.1	14.1	Negligible	14.0	14.1	Negligible
R22	381212.3	404293.0	1.5	14.0	14.1	Negligible	14.0	14.0	Negligible
R23	381224.0	404298.0	1.5	14.0	14.0	Negligible	14.0	14.0	Negligible
Proposed Receptors									
PR1	381335.8	404145.8	1.5	-	14.1	-	-	14.1	-
PR2	381367.8	404062.3	1.5	-	14.3	-	-	14.3	-

Table H-2: PM₁₀ Annual Mean Concentrations at Modelled Receptors During the Operation Phase

Modelled PM₁₀ concentrations in both the 2023 and 2031 DM and DS scenarios meet the annual mean PM₁₀ objectives at all receptor locations. The maximum predicted PM₁₀ concentration for the existing receptors in the worst case (2023 emissions) and realistic case (2031 emissions) DS scenarios is 15.3 µg/m³, and the maximum predicted concentration for the proposed receptors is 14.3 µg/m³, which are below the annual mean objective (40 µg/m³).

The predicted impact of the Proposed Development on modelled receptors is negligible for all receptors.

Long Term PM_{2.5} Concentrations: Operation Phase Road Traffic Emissions

Predicted PM_{2.5} concentrations at the existing and proposed receptors are presented in Table H-1.

Receptor ID	Location		Height (m)	Annual Mean PM _{2.5} Concentrations µg/m ³					
				2022 Background with 2031 traffic flows and 2023 Emissions			2022 Background with 2031 traffic flows and 2031 Emissions		
	X	Y		Do-minimum	Do-something	Impact	Do-minimum	Do-something	Impact
Existing Receptors									
R1	381331.3	404256.1	1.5	9.4	9.4	Negligible	9.3	9.4	Negligible
R2	381365.7	404229.0	4.5	9.3	9.3	Negligible	9.3	9.3	Negligible
R3	381296.0	404195.6	1.5	9.6	9.6	Negligible	9.5	9.6	Negligible
R4	381225.2	404170.0	4.5	9.4	9.4	Negligible	9.4	9.4	Negligible
R5	381215.7	404178.7	4.5	9.6	9.5	Negligible	9.5	9.5	Negligible
R6	381204.5	404245.7	1.5	9.4	9.4	Negligible	9.3	9.4	Negligible
R7	381129.6	404144.0	4.5	9.4	9.4	Negligible	9.4	9.4	Negligible
R8	381141.0	404136.6	4.5	9.5	9.5	Negligible	9.5	9.5	Negligible
R9	381171.4	404071.8	4.5	9.4	9.4	Negligible	9.4	9.4	Negligible
R10	381234.9	403961.4	4.5	8.4	8.4	Negligible	8.4	8.4	Negligible
R11	381340.3	403767.7	1.5	8.6	8.6	Negligible	8.5	8.6	Negligible
R12	381281.0	403909.8	4.5	8.7	8.7	Negligible	8.7	8.7	Negligible
R13	381374.8	403921.8	1.5	8.3	8.3	Negligible	8.3	8.3	Negligible
R14	381340.4	404025.6	1.5	9.2	9.2	Negligible	9.2	9.2	Negligible
R15	381362.3	404036.9	1.5	9.2	9.2	Negligible	9.2	9.2	Negligible
R16	381083.5	404376.0	1.5	9.8	9.8	Negligible	9.7	9.7	Negligible
R17	381124.7	404260.8	1.5	10.0	10.0	Negligible	9.9	9.9	Negligible
R18	381262.0	404236.5	1.5	9.3	9.3	Negligible	9.2	9.3	Negligible
R19	381224.8	404258.9	1.5	9.3	9.3	Negligible	9.2	9.3	Negligible
R20	381220.3	404270.9	1.5	9.2	9.3	Negligible	9.2	9.2	Negligible
R21	381215.7	404283.0	1.5	9.2	9.3	Negligible	9.2	9.2	Negligible
R22	381212.3	404293.0	1.5	9.2	9.2	Negligible	9.2	9.2	Negligible
R23	381224.0	404298.0	1.5	9.2	9.2	Negligible	9.2	9.2	Negligible
Proposed Receptors									
PR1	381335.8	404145.8	1.5	-	9.3	-	-	9.2	-
PR2	381367.8	404062.3	1.5	-	9.4	-	-	9.4	-

Table H-3: PM_{2.5} Annual Mean Concentrations at Modelled Receptors During the Operation Phase

Modelled PM_{2.5} concentrations in both the 2023 and 2031 DM and DS scenarios meet the annual mean PM_{2.5} objectives at all receptor locations. The maximum predicted PM_{2.5} concentration for the existing receptors is 10.0 µg/m³ in the worst case (2023 emissions) and 9.9 µg/m³ in the realistic case (2031 emissions) DS scenario, and the maximum predicted concentration for the proposed receptors is 9.4 µg/m³, which are below the annual mean objective (20 µg/m³).

The predicted impact of the Proposed Development on modelled receptors is negligible for all receptors.

Annex I – Mitigation Measures for Construction

Primary measures are those that will be implemented at all times; Secondary measures will be implemented as necessary (in agreement with the local authority), while n/a measures are not required for a given level of risk.

Site Management	High Risk
1. Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.	Primary
2. Display the head or regional office contact information.	Primary
3. Record and respond to all dust and air quality pollutant emissions complaints.	Primary
4. Make a complaint log available to the local authority.	Primary
5. Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority.	Primary
6. Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry, or windy conditions.	Primary
7. Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.	Primary
8. Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site.	Primary
9. Develop a dust management plan (forming part of a Construction Environmental Management Plan (CEMP)/Construction Logistics Plan).	Primary
10. Hold regular liaison meetings with other high-risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.	Primary

Table I-1: Construction Mitigation Measures - Site Management

Preparing and Maintaining the Site	High Risk
11. Plan site layout: machinery and dust causing activities will be located away from receptors.	Primary
12. Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on-site.	Primary
13. Avoid site runoff of water or mud.	Primary
14. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Primary
15. Keep site fencing, barriers, and scaffolding clean using wet methods.	Primary
16. Remove materials from site as soon as possible.	Primary
17. Cover, seed, or fence stockpiles to prevent wind whipping.	Primary
18. Agree monitoring locations with the local authority.	Primary
19. Where possible, commence baseline monitoring at least three months before phase begins.	Primary
20. Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.	Primary
21. Carry out regular dust soiling checks of buildings within 100 m of site boundary and, if necessary, cleaning to be provided.	Primary
22. Consider, if practical, installation of green walls, screens, or other green infrastructure to minimise the impact of dust and pollution.	Secondary

Table I-2: Construction Mitigation Measures - Preparing and Maintaining the Site

Operating Vehicle/Machinery and Sustainable Travel	High Risk
23. Ensure all non-road mobile machinery (NRMM) complies with relevant local standards.	Primary
24. Ensure all vehicles switch off engines when stationary – no idling vehicles.	Primary
25. Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment.	Primary
26. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	Primary
27. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Primary
28. Impose and signpost a maximum-speed-limit of 10 mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority).	Primary

Table I-3: Construction Mitigation Measures - Operating Vehicle/Machinery and Sustainable Travel

Operations	High Risk
29. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Primary
30. Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water).	Primary
31. Use enclosed chutes, conveyors, and covered skips.	Primary
32. Minimise drop heights from conveyors, loading shovels, hoppers, and other loading, or handling equipment, and use fine water sprays on such equipment.	Primary
33. Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Primary

Table I-4: Construction Mitigation Measures - Operations

Waste Management	High Risk
34. Reuse and recycle waste to reduce dust from waste materials	Primary
35. Avoid bonfires and burning of waste materials.	Primary

Table I-5: Construction Mitigation Measures - Waste Management Activities

Measurement Specific to Demolition	High Risk
36. Ensure water suppression is used during demolition operations.	Primary
37. Avoid explosive blasting, using appropriate manual, or mechanical alternatives.	Primary
38. Bag and remove any biological debris or damp down such material before demolition.	Primary
39. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Primary

Table I-6: Construction Mitigation Measures - Demolition Activities

Measurement Specific to Earthworks	High Risk
40. Consider re-vegetating earthworks and exposed areas/soil stockpiles to stabilise surfaces.	Primary
41. Consider the use of hessian, mulches, or trackifiers where it is not possible to re-vegetate or cover with topsoil.	Primary
42. Only remove secure covers in small areas during work and not all at once.	Primary

Table I-7: Construction Mitigation Measures - Earthworks Activities

Measurement Specific to Construction	High Risk
43. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Primary
44. Avoid scabbling (roughening of concrete surfaces) if possible	Primary
45. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Primary
46. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	Secondary

Table I-8: Construction Mitigation Measures - Construction Activities

Measures Specific To Trackout	High Risk
47. Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site.	Primary
48. Avoid dry sweeping of large areas.	Primary
49. Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	Primary
50. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site).	Primary
51. Record all inspections of haul routes and any subsequent action in a site log book.	Primary
52. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned.	Primary
53. Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;	Primary
54. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size, and layout permits.	Primary
55. Access gates to be located at least 10 m from receptors where possible.	Primary
56. Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.	Secondary

Table I-9: Construction Mitigation Measures - Trackout Activities

Cundall Johnston & Partners LLP

Fourways House 57 Hilton St Manchester M1 2EJ

Tel: +

Asia Australia Europe MENA UK and Ireland

www.cundall.com

