

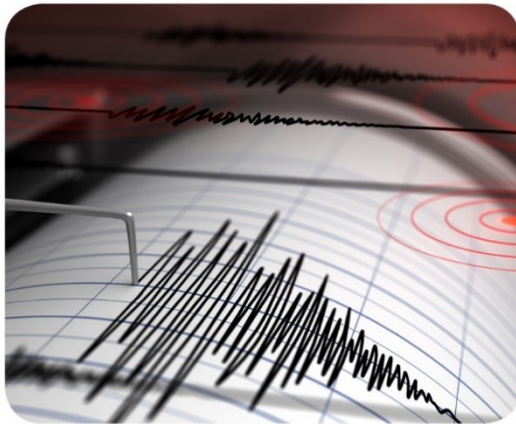


Barratt & David Wilson Homes North West

Kingsway, Rochdale

Air Quality Assessment

June 2022



airandacoustics.co.uk



Barratt & David Wilson Homes North West

Kingsway, Rochdale

Air Quality Assessment

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Executive Summary

This Air Quality Assessment (AQA) has been produced in support of a full planning application for a proposed residential scheme, on land off Broad Lane, Rochdale. The AQA has considered the potential air quality impacts resulting from the construction and operation of the Proposed Development upon existing sensitive receptors as well as the suitability of the Application Site for the introduction of new sensitive receptors.

The Application Site is located near to an Air Quality Management Area (AQMA). Local Authority monitoring and the DEFRA background concentrations suggest that the NO₂, PM₁₀ and PM_{2.5} at the Application Site are expected to comply with the respective annual mean objectives.

The AQA shows that the dust impacts associated with the construction phase of the Proposed Development, with the implementation of the suggested mitigation measures, although adverse, will be temporary and '**not significant**' at sensitive receptors.

The AQA shows that the air quality impacts associated with the Proposed Development are considered to be '**not significant**' at the existing sensitive local receptors. Furthermore, concentrations at the Application Site are anticipated to be at a level suitable for the introduction of new sensitive receptors, and fall within APEC-A, which states *"no air quality grounds for refusal; however, mitigation of any emissions should be considered."*

The Proposed Development is therefore expected to comply with all relevant national, regional and local air quality policy.

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1 Introduction

1.1 Brief

- 1.1.1 Air & Acoustic Consultants Limited have been commissioned by Barratt & David Wilson Homes North West to an AQA in support of a full planning application for a proposed residential development on land off Broad Lane and Lower Lane, Kingsway, Rochdale.

1.2 Application Site

- 1.2.1 The Application Site is currently mainly grassland containing a Grade II listed farmhouse and barn, east of Broad Lane and Lower Lane. The Application Site is bound to the north by grassland, the east by the car park for an Asda Distribution Hub (Plot J1), the south by residential properties and the west by Broad Lane and Lower Lane and associated residential properties.
- 1.2.2 It is noted that full planning permission was granted by Rochdale Metropolitan Borough Council (RMBC) in June 2021 for the development of Kingsway Business Park Plot J2, located to the north of the Application Site. The planning application (21-00608-FUL) was for the:
- “Development of site for storage of operational vehicles, including site levelling, drainage and resurfacing, formation of access, associated parking, acoustic and security fencing, retaining walls, guard hut, welfare building, substations, landscaping, lighting columns and all related engineering and infrastructure works.”*
- 1.2.3 The Application Site is located within the jurisdiction of Rochdale Metropolitan Borough Council (RMBC). The National Grid Reference for the centre of the Application Site is SD 91170 11230 (British National Grid co-ordinates E: 391170, N: 411230). The Application Site location and surrounding area are shown in [Figure 1.1](#).

Figure 1.1: Site Location



1.3 Development Proposals

- 1.3.1 The planning application seeks approval for the development of 64 residential units. This is illustrated in Figure 1.2.

Figure 1.2: Proposed Site Layout



1.4 Assessment Approach

1.4.1 This AQA has been undertaken to assess if the proposed scheme is likely to give rise to any significant air quality or dust impacts, and to establish the magnitude and the significance of such impacts caused as a result of the scheme. Furthermore, due to the development of Kingsway Business Park Plot J2 not currently being in operation / built, a consideration of the potential impacts on the future residential receptors (associated with the Proposed Development), has been considered.

1.4.2 The report is structured as follows:

- **Section 2** sets out an overview of the national and local air quality policy context, in relation to the scheme proposals;
- **Section 3** details the methodology for estimating the air quality impacts;
- **Section 4** describes the baseline air quality conditions;
- **Section 5** considers the construction phase dust impacts;
- **Section 6** considers the impacts of traffic emissions during the operational phase, considering both the impacts on existing receptors and future residential receptors;
- **Section 7** describes potential mitigation measures for the construction and operational phase(s) (where required); and
- **Section 8** summarises and concludes the assessment.

2 Legislation and Policy Context

2.1 European Legislation

- 2.1.1 Air pollutants at high concentrations can give rise to adverse effects upon the health of both humans and ecosystems. The European Union (EU) legislation on air quality forms the basis for the national UK legislation and policy.
- 2.1.2 The EU Framework Directive 2008/50/EC came into force in May 2008 and sets out legally binding limits for concentrations of the major air pollutants that can impact on public health. This Directive came into force in England in June 2010¹. Amendments to this Directive were made following amendments to the 2008/50/EC and 1004/107/EC on air quality made by Directive 2015/1480/EC. The updated Directive, The Air Quality Standards (Amendment) Regulations 2016, came into force on 31st December 2016².
- 2.1.3 Following the UK's departure from the EU and the Brexit transition period the previous EU Legislation has been retained in the United Kingdom. The following text is taken from the legislation.gov.uk³ website, setting out details of the retention:

"The UK is no longer a member of the European Union. EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies, and is published on legislation.gov.uk.

[...]

EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 has been retained in UK law as a form of domestic legislation known as 'retained EU legislation'. This is set out in sections 2 and 3 of the European Union (Withdrawal) Act 2018 (c. 16)."

2.2 National Legislation, Policy and Strategy

- 2.2.1 Part IV of the Environment Act 1995⁴ requires local authorities to review and assess the air quality within their boundaries. As a result, the Air Quality Strategy was adopted in 1997⁵, with national health-based standards and objectives set out for the, then, eight key air pollutants including benzene, 1-3 butadiene, carbon monoxide, lead, nitrogen dioxide (NO₂), ozone, particulate matter and sulphur dioxide.
- 2.2.2 Part IV of the Environment Act 2021⁶ amends both the Environment Act 1995 and the Clean Air Act 1993⁷. It builds on the foundations provided by Part IV of the Environment Act 1995 and strengthens the Local Air Quality Management (LAQM) framework. The act allows the Secretary of State to make provisions for, about or connect with the recall of relevant products that do not meet relevant environmental standards.
- 2.2.3 The government have resisted calls for the adoption of the recently updated World Health Organisation (WHO) air quality guidelines, specifically targeting particulate matter pollution. The act does introduce a duty on the government to bring forward at least two air quality targets by October 2022 for consultation

¹ Statutory Instrument, 2010. *The Air Quality Standards Regulations*, No. 1001. Queen's Printer of Acts of Parliament.

² Statutory Instrument, 2016. *The Air Quality Standards Regulations*, No. 1184. Queen's Printer of Acts of Parliament.

³ EU legislation and UK law. Accessible at: <https://www.legislation.gov.uk/eu-legislation-and-uk-law>

⁴ Parliament of the United Kingdom, 1990. *Environmental Protection Act*, Chapter 43. Queen's Printer of Acts of Parliament.

⁵ Department for Environment Food and Rural Affairs, 1997. *The United Kingdom National Air Quality Strategy*, Cm 3587.

⁶ UK Public General Acts, 2021. *Environmental Act 2021*, Chapter 30. Queen's Printer of Acts of Parliament.

⁷ UK Public General Acts, 1993. *Clean Air Act 1993*, Chapter 11. Queen's Printer of Acts of Parliament.

that will be set in secondary legislation. The first will aim to reduce the annual average level of fine particulate matter (PM_{2.5}) in ambient air. The second will be a long-term target (set a minimum of 15 years in the future), which the government says, “*will encourage long-term investment and provide certainty for businesses and other stakeholders.*”

- 2.2.4 The purpose of the Air Quality Strategy was to identify areas where air quality was unlikely to meet the objectives prescribed in the regulations. The strategy was reviewed in 2000 and the amended Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2000)⁸ was published. This was followed by an Addendum in February 2003 and in July 2007, when an updated Air Quality Strategy was published⁹.
- 2.2.5 The pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence regarding how each pollutant affects human health. Pollutant objectives are the future dates by which each standard is to be achieved, considering economic considerations, practical and technical feasibility.
- 2.2.6 The air quality objectives are managed through the LAQM regime, which is defined within the Air Quality (England) Regulations 2000 (SI 928) and The Air Quality (England) (Amendment) Regulations 2002 (SI 3043). [Table 2.1](#) lists the National Air Quality Objectives that are relevant to this AQA, as set out in the Air Quality Standards (Amendment) Regulations 2016.

Table 2.1: Air Quality Objectives (England)

Pollutant	Air Quality Objective	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³	1-hour mean not to be exceeded more than 18 times per year
NO ₂	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ *	24-hour mean not to be exceeded more than 35 times per year
PM ₁₀	40 µg/m ³ *	Annual mean
Particulate Matter (PM _{2.5})	25 µg/m ³ *	Annual mean – Stage 1 limit value pre 2020.
PM _{2.5}	20 µg/m ³ *	Annual mean – Indicative Stage 2 limit value post 2020. 15% reduction in background to be achieved between 2010 & 2020 at Urban Background sites
Notes: *Except Scotland		

Statutory Nuisance

- 2.2.7 Under Part III of the Environmental Protection Act (1990)¹⁰, it is the duty of the local authorities to take steps as reasonably practical to investigate issues that could be a ‘statutory nuisance’. Potential causes of statutory nuisance include:

⁸ Department of the Environment, Transport and the Regions, 2000. The Air Quality Strategy for England, Scotland, Wales, and Northern Ireland

⁹ Department for Environment Food and Rural Affairs, 2007. *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, Cm 7169, Department for Environment Food and Rural Affairs.

¹⁰ UK Public General Acts, 1990. *Environmental Protection Act 1990, Chapter 43. Queen’s Printer of Acts of Parliament.*

- Any premises in such a state as to be prejudicial to health or a nuisance;
- Smoke emitted from premises so as to be prejudicial to health or a nuisance;
- Fumes or gases emitted from premises so as to be prejudicial to health or a nuisance;
- Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance; or
- Any accumulation or deposit which is prejudicial to health or a nuisance.

2.2.8 The local authority may serve an abatement notice on the person, premises owner or occupier if it is satisfied with the existence or likely existence of a statutory nuisance(s). Should the abatement notice not be complied with, penalties such as a fine or prosecution could occur. However, it is considered as a defence if the best practicable means to stop or reduce a nuisance are employed.

2.2.9 The most likely cause of a statutory nuisance associated with this AQA is dust. Dust is the generic term used in the British Standard document BS 6069 (Part Two)¹¹, to describe particulate matter in the size range 1–75µm (micrometres) in diameter. This document has been withdrawn and has been replaced with the BS ISO 4225:2020¹² document. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition.

National Planning Policy

2.2.10 The National Planning Policy Framework (NPPF)¹³ (2021) sets out the planning policy for England, to help achieve sustainable development within the planning sector.

2.2.11 Paragraph 105 states:

“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.”

2.2.12 Paragraph 174 states:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.

[...]”

¹¹ The British Standards Institution, 1994. BS6069-2:1994 - Characterization of air quality.

¹² The British Standards Institution, 2020. BS ISO 4225:2020 - Air quality.

¹³ Ministry of Housing, Communities & Local Government, 2021. National Planning Policy Framework.

2.2.13 Paragraph 185 states:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.”

2.2.14 Paragraph 186 states:

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

2.2.15 Paragraph 188 states:

“The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

2.2.16 The NPPF also sets out the national planning policy on biodiversity and conservation. This emphasises that the planning system should seek to minimise effects on and provide net gains in biodiversity, wherever possible, as part of the Government's commitment to halting decline and establishing coherent and resilient ecological networks.

2.2.17 The NPPF is supported by Planning Practice Guidance (PPG)¹⁴ (DCLG, 2021), which sets out the principles on how planning can take account of the impacts of new developments on air quality.

2.2.18 Paragraph 001 Reference ID: 32-001-20191101 states:

“The 2008 Ambient Air Quality Directive sets legally binding limits for concentrations in outdoor air of major air pollutants that affect public health such as particulate matter (PM₁₀ and PM_{2.5}) and nitrogen dioxide (NO₂).

The UK also has national emission reduction commitments for overall UK emissions of 5 damaging air pollutants:

- *fine particulate matter (PM_{2.5})*
- *ammonia (NH₃)*

¹⁴ Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government. Planning Practice Guidance. Accessible at: <http://planningguidance.planningportal.gov.uk/>

- *nitrogen oxides (NO_x)*
- *sulphur dioxide (SO₂)*
- *non-methane volatile organic compounds (NMVOCs)*

As well as having direct effects on public health, habitats and biodiversity, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. Odour and dust can also be a planning concern, for example, because of the effect on local amenity."

2.2.19 Paragraph: 005 Reference ID: 32-005-20191101 states:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

Where air quality is a relevant consideration the local planning authority may need to establish:

- *The 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*
- *whether occupiers or users of the development could experience poor living conditions or health due to poor air quality."*

National Clean Air Strategy

2.2.20 The Clean Air Strategy (CAS)¹⁵ was published in January 2019 and sets out how the government will improve air quality nationally. The document aims to tackle the issue of air quality across all parts of government and society to protect public health and the environment, and identifies what needs to be done to achieve this. The document complements the Industrial Strategy (archived), the Clean Growth Strategy¹⁶ and the 25 Year Environment Plan¹⁷ and is a key part of delivering the government's 25 Year Environmental Plan.

2.2.21 The document has adopted international targets to reduce emissions of fine particulate matter, ammonia, nitrogen oxides, sulphur dioxide and non-methane volatile organic compounds by 2020 and 2030. The document proposes tougher goals to cut public exposure to particulate matter pollution, as recommended by the WHO.

2.2.22 The strategy not only targets the reduction of emissions, but also a reduction in exposure.

¹⁵ Department for Environment, Food and Rural Affairs, 2019. *Clean Air Strategy 2019*.

¹⁶ Department for Business, Energy and Industrial Strategy, 2017. *The Clean Growth Strategy*.

¹⁷ Department for Environment, Food and Rural Affairs, 2018. *A Green Future: Our 25 Year Plan to Improve the Environment*.

[Reducing Emissions from Road Transport: Road to Zero Strategy](#)

- 2.2.23 The *Reducing emissions from road transport: Road to Zero Strategy*¹⁸ (2018) document produced by the Office for Low Emission Vehicles (OLEV), Office for Zero Emission Vehicles (OZEV) and the Department for Transport (DfT) sets out how the government aims to end the sale of new conventional petrol and diesel cars and vans by 2040, with almost every car and van having zero emissions by 2050. Furthermore, the aim of the government is to see at least 50%, and as many as 70%, of new car sales being ultra-low emission by 2030 (and up to 40% of new van sales).
- 2.2.24 A number of measures have been set out in the document which outlines how the government will support this gradual transition, some of which are consumer incentives, research and development and innovation support based.
- 2.2.25 Since this document was released, the Prime Minister has announced that, as part of the *Ten Point Plan for a Green Industrial Revolution* (2020)¹⁹, the government will end the sale of new petrol and diesel cars and vans from 2030, 10 years earlier than set out in the document above.
- 2.2.26 This ambitious plan will see road traffic-related oxides of nitrogen (NO_x) emissions reduce significantly over the coming decades, likely beyond the scale of reductions forecast in air quality tools used to assess air quality impacts.

2.3 Regional Legislation, Planning Policy and Strategy

[Greater Manchester Clean Air Plan](#)

- 2.3.1 Greater Manchester's (GM) Clean Air Plan is a commitment from the combined authority area to clean up the air the residents breathe, in a way that helps people make the change to cleaner vehicles and does not put jobs, livelihoods and businesses at risk. It includes proposals for the GM Clean Air Zone (CAZ). This was due to be implemented on 30th May 2022, but it has been agreed with the government that the CAZ would not go ahead.
- 2.3.2 A new Clean Air Plan is being prepared for publication by July 2022.

2.4 Local Legislation, Planning Policy and Strategy

[Rochdale Metropolitan Borough Council Adopted Core Strategy](#)

- 2.4.1 The RMBC Adopted Core Strategy²⁰ was prepared under the NPPF to set out the long-term spatial strategy for the future development of the Rochdale Borough. The plan will run through until 2028; the following policies have been included in this assessment as they relate to air quality:
- 2.4.2 Policy G9: *Reducing the impact of pollution, contamination and land instability* states:

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

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

¹⁸ Department for Transport, Office for Low Emission vehicles and Office for Zero Emission Vehicles, 2018. *Reducing emissions from road transport: Road to Zero Strategy*

¹⁹ Department for Transport and Office for Zero Emission Vehicles, 2020. *The Ten Point Plan for a Green Industrial Revolution*

²⁰ Rochdale Borough Council, 2016. *Rochdale Adopted Core Strategy*.

- b. Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;*
- c. Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;*
- d. Requiring a Low Emissions Strategy (LES) where development requires a Transport Assessment, and in other circumstances as appropriate;*

[...]

- g. Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development.*

[...]"

2.4.3 Policy DM1: General development requirements, states:

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

[...]

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

[...]"

2.4.4 Policy DM2: Delivering planning contributions and infrastructure, states:

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

These contributions may cover, dependent on need:

[...]

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

[...]"

2.5 Air Quality Action Plans

[National Air Quality Action Plan](#)

- 2.5.1 The Department for Environment, Food & Rural Affairs (DEFRA) has produced an Air Quality Action Plan (AQAP)²¹ to tackle roadside NO₂, throughout the United Kingdom. Along with a package of infrastructure, initiatives and grants, the plan requires local authorities to produce local action plans by March 2018, with the aim of reducing the air quality concentrations below the objective as soon as practically possible, should they be predicting exceedances of the air quality objectives beyond 2020.

²¹ Department for Environment Food & Rural Affairs & Department for Transport, 2017. *UK plan for tackling roadside nitrogen dioxide concentrations.*

Local Air Quality Action Plan

2.5.2 The Greater Manchester Combined Authority (GMCA) Air Quality Action Plan (AQAP)²² has been adopted by RMBC, and lists a number of options aimed at improving air quality specific to RMBC. Some of the actions include, but are not limited to:

- Encouraging Travel Planning: TfGM will work with the local authorities to encourage travel planning measures in businesses and individuals to effect a significant modal shift;
- Public Cycle Hire: Explore the feasibility of public cycle hire facilities; and
- Plugged-in Places EV Charging Network: Continue to increase the number of EV charging points.

2.5.3 Further actions are included in GMCA's Air Quality Annual Status Report (ASR)²³.

²² Transport for Greater Manchester & Greater Manchester Combined Authority, 2016. Air Quality Action Plan.

²³ Greater Manchester Combined Authority, 2021. 2020 Air Quality Annual Status Report (ASR).

3 Assessment Approach

3.1 Construction Phase

3.1.1 There is currently no formal assessment criterion for dust, therefore, the approach developed and published by the Institute of Air Quality Management (IAQM), in the *Guidance on the Assessment of Dust from Demolition and Construction* (2016)²⁴ document has been utilised as part of this assessment. The approach consists of a five-step process to assess the potential level of risks, (Large, Medium, Small or Negligible), regarding the four main phases of development (demolition, earthworks, construction, and trackout). The assessment includes consideration of pre-mitigation and post-mitigation impacts, based on the scale and nature of the Proposed Development.

3.1.2 The main air quality impacts that may arise during demolition and construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM₁₀ and PM_{2.5} concentrations, as a result of dust generating demolition and construction activities; and
- An increase in concentrations of NO₂ due to exhaust emissions from vehicles and equipment.

3.1.3 In relation to the most likely impacts, the guidance states the following:

“The most common impacts are dust soiling and increased ambient PM₁₀ concentrations due to dust arising from activities on the site. Dust soiling will arise from the deposition of particulate matter in all size fractions.

[...]

Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed.”

3.1.4 The approach states that an assessment will normally be required where there are either:

- Human receptors within 350 m of the site boundary, and/or within 50 m of the routes used by construction vehicles on the local highway network and up to 500 m from site entrances; and/or
- Ecological receptors within 50 m of the site boundary, or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

3.1.5 An ecological receptor refers to any sensitive habitat that is susceptible to dust soiling. For locations with a statutory designation, such as Ramsar Conservation Sites, Sites of Specific Scientific Interest (SSSI), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), consideration should be given as to whether the specific site is sensitive to dust. Some non-statutory sites, (such as Local Nature Reserves (LNR)) may also have to be considered if appropriate.

²⁴ Institute of Air Quality Management, 2016. *Guidance on the Assessment of Dust from Demolition and Construction.*

- 3.1.6 The degree of risk is then derived from the level of the risk, and the sensitivity of the receptor being considered. To note, not all the criteria for a particular risk class needs to be met for magnitude or significance. It is suggested in IAQM (2016) guidance that other criteria, (such as professional judgement) can be used to justify the assessment.
- 3.1.7 The full dust Impact assessment methodology is set out in [Appendix A](#), and the assessment is set out in [Section 5](#).

3.2 Operational Phase – Traffic Emissions

[Environmental Protection UK & Institute of Air Quality Management Guidance](#)

- 3.2.1 The Environmental Protection UK (EPUK) & IAQM (2017)²⁵ *Land-Use Planning and Development Control: Planning for Air Quality* document has been used to determine the potential for impacts on air quality.
- 3.2.2 This guidance document provides indicative screening criterion for when an Air Quality Impact Assessment is required. The following screening criterion has been considered for this AQA:

[Local Highway Network](#)

Step 1:

- If any of the following apply to the Proposed Development:
 - Contains 10 or more residential units or a site area of more than 0.5ha; or
 - Contains more than 1,000 m² of floor space for all other uses or a site area greater than 1ha.
- Coupled with any of the following:
 - The development has more than 10 parking spaces; or
 - The development will have a centralised energy facility or other centralised combustion process.

Step 2:

- A change of cars / LDVs (light-duty vehicles) flow of:
 - More than 100 AADT within or adjacent to an AQMA; or
 - More than 500 AADT elsewhere.
- A change of HDVs (heavy-duty vehicles) flow of:
 - More than 25 AADT within or adjacent to an AQMA; or
 - More than 100 AADT elsewhere

- 3.2.3 Should these criteria not be met, then the guidance document considers air quality impacts associated with a scheme to be 'insignificant' and no further assessment is required.
- 3.2.4 As the Proposed Development will see more than 10 residential units constructed, and car parking is expected to exceed 10 spaces, the Step 1 criteria is exceeded.

²⁵ Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM), 2017. *Land-use Planning & Development Control: Planning for Air Quality*.

- 3.2.5 A review of the traffic data provided by the transport consultant indicates that the Proposed Development will generate 325 two-way average daily vehicle movements, all of which are classified as LDVs (cars). In isolation, this would not require a full impact assessment, however a further screening exercise has been undertaken to assess the potential traffic impact at sensitive locations in the nearby AQMA. As the Application Site is situated near to an AQMA, a review of the traffic flow split was required. The traffic is expected to split 70% north and 30% south at the junction of Broad Lane with the B4194. The northbound traffic is then further expected to split 65% north and 35% south at the junction with Oldham Road. This results in an additional AADT through the Rochdale AQMA of ~148 vehicles per day. This exceeds the Step 2 criteria and therefore a full Air Quality Impact Assessment is required for the Proposed Development.
- 3.2.6 The operational air quality impact assessment is set out in [Section 6](#) and the parameters of this assessment are set out below.

3.3 Modelling Parameters

[Sensitive Locations](#)

- 3.3.1 The concentrations of NO₂, PM₁₀ and PM_{2.5} have been considered as part of this assessment. While selecting the receptor locations, careful consideration was made to receptors located near key road junctions, where congestion may occur, or where a number of highway links merge.
- 3.3.2 The sensitive locations at which the standards and objectives apply are places where the population is expected to be exposed to the various pollutants over the particular averaging period. Thus, for those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to measure concentrations against the set standards are areas of residential housing, since it is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time.
- 3.3.3 Schools and children's playgrounds are also often used as sensitive locations for comparison with annual mean objectives due to the increased sensitivity of young people to the effects of pollution (regardless of whether or not their exposure to pollution could be over an annual period). For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time, such as on public footways or residential amenity areas.
- 3.3.4 DEFRA (2021) LAQM Technical Guidance (TG16)²⁶ states:

"Dispersion models cannot predict short-term concentrations as reliably as annual mean concentrations

[...]

Previous research carried out on behalf of Defra and the Devolved Administrations 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 local authorities should refer to it."

- 3.3.5 The existing modelled receptor locations are outlined in [Table 3.1](#) and illustrated in [Figure 3.1](#) and [Figure 3.2](#). The future modelled receptor locations are outlined in [Table 3.2](#) and illustrated in [Figure 3.3](#).

²⁶ Department for Environment, Food & Rural Affairs, 2021. *Local Air Quality Management. Technical Guidance (TG16)*.

Table 3.1: Receptor Locations

ID	Description	Coordinates (m)		
		X	Y	Z
Existing Human Receptors				
R1	Existing Residential Receptor	390458	411551	1.5
S1	Existing School Receptor	390499	411968	1
R2	Existing Residential Receptor	390402	411867	4.5
S2	Existing School Receptor	390967	412188	1
S3	Existing School Receptor	390438	411583	1
R3	Existing Residential Receptor	389763	411637	1.5
R4	Existing Residential Receptor	390355	412266	1.5
R5	Existing Residential Receptor	390159	411868	1.5
R6	Existing Residential Receptor	390412	411913	4.5
R7	Existing Residential Receptor	390461	411979	1.5
RO23ANO	Existing Diffusion Tube – representative of Existing Residential Receptor	390377	412030	2.5

Figure 3.1: Existing Receptor Locations

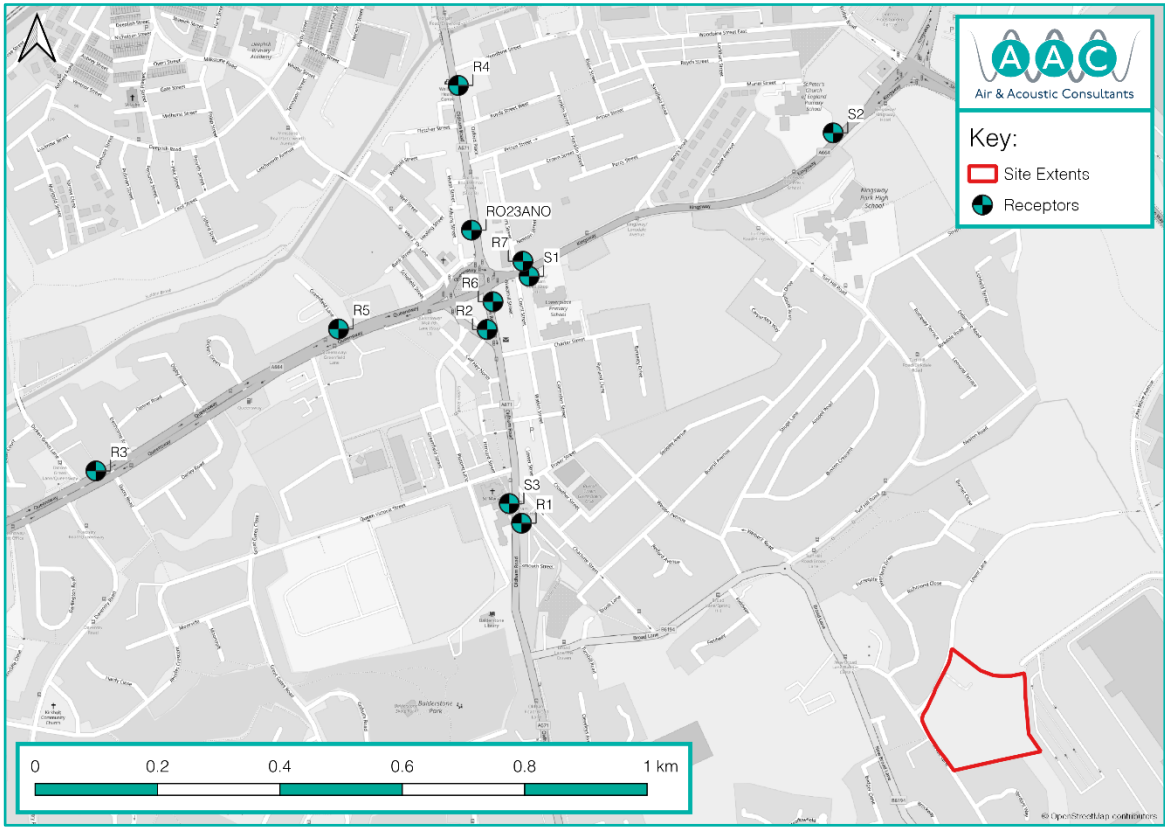


Figure 3.2: Junction View

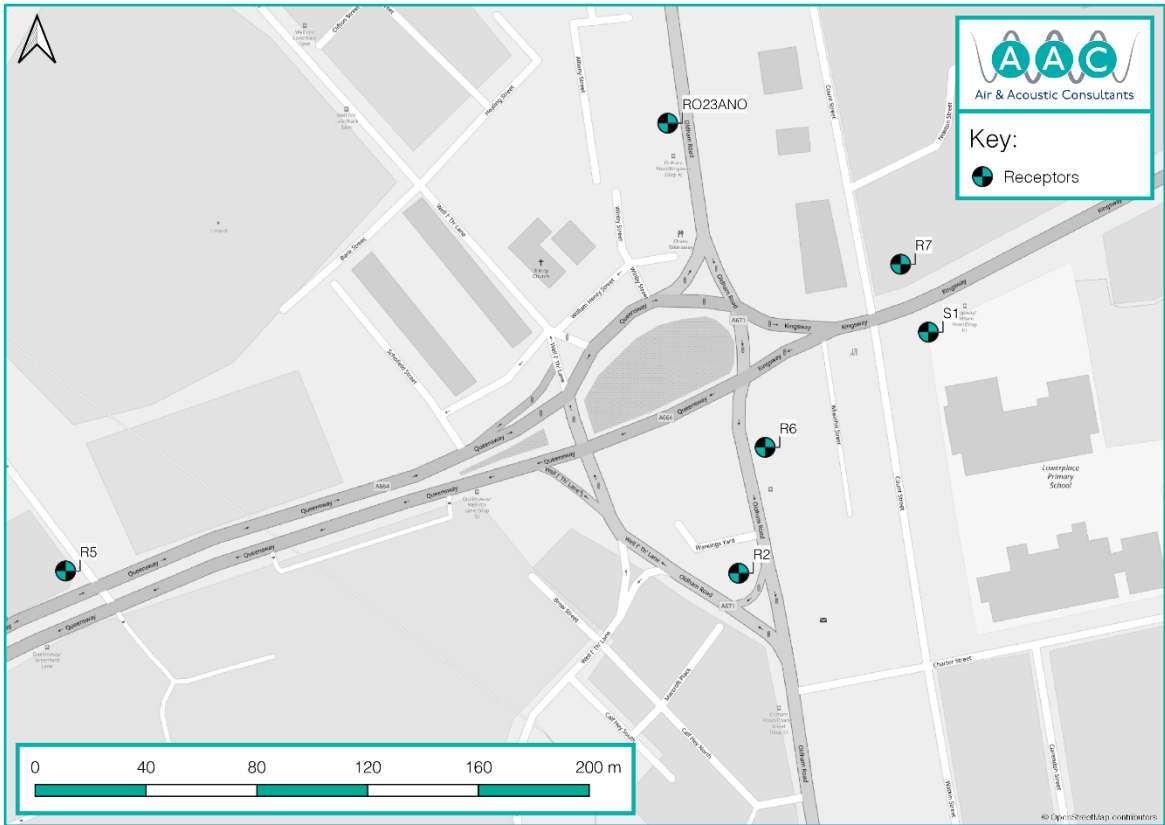


Table 3.2: Future Receptor Locations

ID	Description	Coordinates (m)		
		X	Y	Z
Future Human Receptors				
FR1	Future Residential Receptor	391172	411319	1.5
FR2	Future Residential Receptor	391190	411303	1.5
FR3	Future Residential Receptor	391219	411288	1.5
FR4	Future Residential Receptor	391269	411277	1.5

Figure 3.3: Future Receptors



Assessment Scenarios

3.3.6 The following scenarios have been considered for this AQA:

- 2019 Verification (and Baseline); and
- 2019 Baseline + Proposed Development

3.3.7 The traffic data utilised within this assessment has been provided by the transport consultant, Bannersgate Transportation Ltd, and obtained from the Department for Transport²⁷ website, as set out in [Appendix B](#) for the '2019 Verification (and Baseline)' and 2019 Baseline + Proposed Development' assessment year scenarios. The Kingsway Business Park Plot J2 development has been modelled within the '2019 Baseline + Proposed Development' scenario. The traffic for this has been obtained from the Vectos Transport Statement²⁸ for this development.

Modelling Methodology

3.3.8 The modelling of the release of vehicular emissions, (dispersion), into the air has been carried out using the latest version of the air dispersion model: ADMS-Roads model (v5.0.1.3). The model calculates pollution concentrations and deposition over a specified area and / or at a specified location, based upon the following input information:

- Source parameters: e.g. highway width, average speed of vehicles, the number of vehicles per hour and the diurnal traffic profile;
- Meteorological parameters: e.g. wind speed, direction, precipitation, temperature and atmospheric stability; and
- Topographical factors: e.g. ground levels, gradients, buildings and surface roughness.

3.3.9 Junctions have been modelled in line with the LAQM Technical Guidance (TG(16))²⁹, which states:

"For junctions, common sense, driving experience and local knowledge are helpful to estimate speeds. For example, for a section of road leading up to traffic lights, the aim should be to estimate average speeds over a 50 m section of road:

- *Traffic pulling away from the lights, e.g. 40-50 kph;*
- *Traffic approaching the lights when green, e.g. 20-50 kph; and*
- *Traffic on the carriageway approaching the lights when red, e.g. 5-20 kph, depending on the time of day and how congested the junction is.*

It is considered that the combined effect of these three conditions is likely in most instances to be a two-way average speed for all vehicles of 20 to 40 kph. Speeds in similar ranges would also apply at roundabouts, although on sections of large roundabouts, speeds may well average between 40-50 kph."

3.3.10 The meteorological data required for the ADMS-Roads model, must be sourced from a representative location to the study site and include a full year of sequential readings. A review of the nearest available meteorological stations indicates Manchester Airport Meteorological Site is the most suitable site with the most complete/representative information. 2019 meteorological data has been utilised for this assessment in line with the verification year.

3.3.11 It is recognised that a minimum data capture of 90 % is recommended for representing hourly dispersion conditions within the dispersion model. Missing lines of meteorological data can be interpolated or filled by data for these specific hours from a neighbouring site. The data capture at Manchester Airport

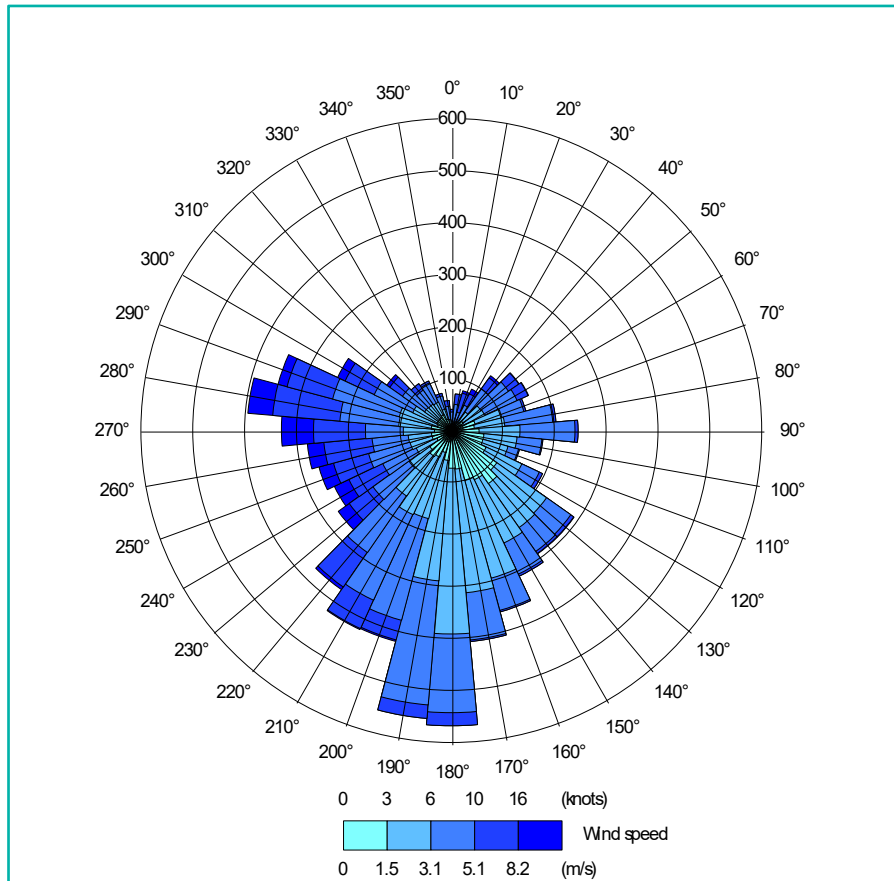
²⁷ Department for Transport. Road Traffic Statistics. Accessible at: <https://roadtraffic.dft.gov.uk/#6/55.254/-16.161/basemap-regions-countpoints>

²⁸ Vectos, 2021. *Transport Statement. Wilson Bowden. Plot J2 Kingsway Business Park.*

²⁹ Department for Environment, Food and Rural Affairs (2021). LAQM Technical Guidance LAQM.TG16, DEFRA, London.

Meteorological Site for 2019 was within an acceptable margin error, for all parameters. The wind rose is illustrated in Figure 3.4.

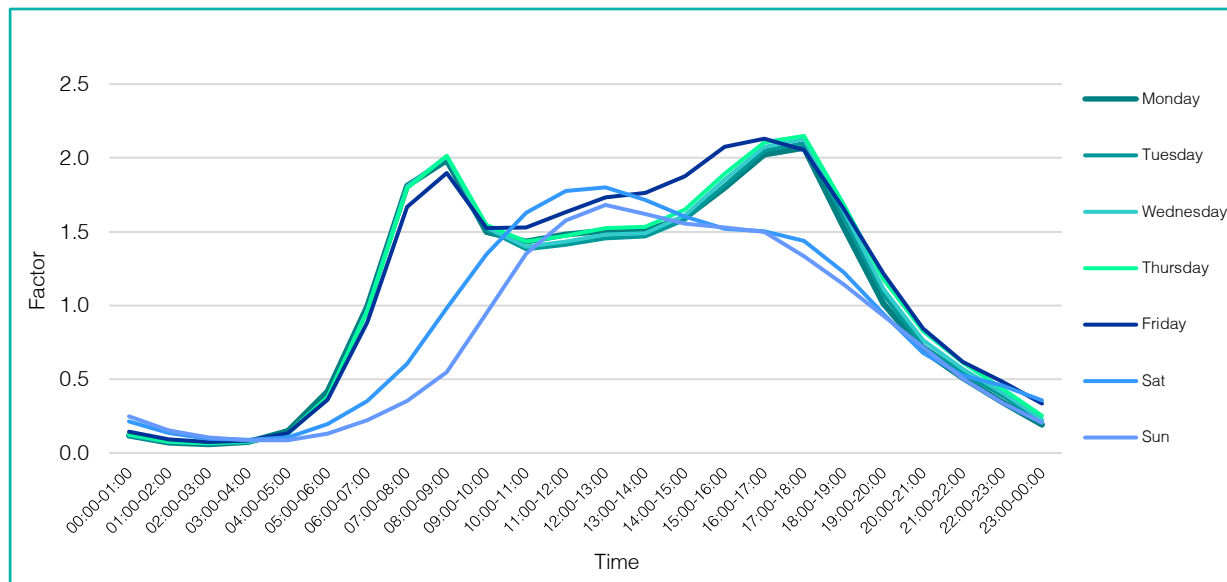
Figure 3.4: Manchester Airport Meteorological Site (2019)



3.3.12 A standard diurnal profile from the Department of Transport website³⁰ has been utilised as part of the modelling process for an average 7-day week. The 2019 diurnal profile is illustrated in Figure 3.5.

³⁰ Department for Transport. Road Traffic Statistics (TRA). Accessible at: <https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra>

Figure 3.5: Diurnal Profile (2019)



Emission Factors

3.3.13 There are numerous sources of NO₂, PM₁₀ and PM_{2.5} which include, for example, industry and domestic origins. However, the main source is usually road transport. For the purpose of this AQA and due to the absence of other sources in the area, only road traffic emissions have been modelled.

3.3.14 The potential impacts have been modelled using the ADMS-Roads model atmospheric dispersion model, with Emission Factor Toolkit v11.0 which is built into the ADMS-Roads model.

3.3.15 It has been widely known for some time that NO_x/NO₂ levels historically have not reduced as quickly as anticipated, and this was identified by DEFRA in 2011. This was recently reiterated in an IAQM Interim Position Statement (v1.1)³¹ released in July 2018 recognising that emissions from diesel vehicles have not declined as expected by DEFRA. This document has since been formally withdrawn, stating:

"There is a growing body of evidence to suggest that the latest COPERT vehicle emission factors, which feed into the EFT (v9 and onwards), reflect the real-world NO_x emissions more accurately.

It is judged that an exclusively vehicle emissions-based sensitivity test is no longer necessary.

On this basis, the EFT may be used for future year modelling with greater confidence when considering the per vehicle emission, provided that the assessment is verified against measurements made in the year 2016 or later."

3.3.16 Therefore, the EFT v11.0 within the ADMS model is acceptable for an assessment year of 2019 and no sensitivity test has therefore been undertaken.

3.3.17 Vehicles emit NO_x with different proportions of NO₂. Following release into the atmosphere, chemical reactions take place between nitric oxide (NO), NO₂ and Ozone (O₃). In this AQA, the modelling of NO_x

³¹ Institute of Air Quality Management, 2018. *Dealing with Uncertainty in Vehicle NO_x Emissions within Air Quality Assessments*.

emissions has taken place and the resulting NO₂ concentration has been calculated post modelling using the DEFRA NO_x to NO₂ Calculator (v8.1)³².

Cold Start Emissions

- 3.3.18 The National Atmospheric Emission Inventory (NAEI) website³³ has been accessed to obtain the fleet composition of petrol and diesel vehicles for 2019.
- 3.3.19 As part of this the NAEI spreadsheet also provides an indicative cold start emission of NO_x PM₁₀ and PM_{2.5} for both petrol and diesel engines.
- 3.3.20 Traffic data utilised for the consented development modelling has been obtained from the Vectos Transport Statement. The following traffic distribution (Table 3.3) has been obtained from the statement, and has been utilised for the area source emissions, including the time varying emission factors as set out in Appendix E.

Table 3.3: Proposed Vehicle Trips Van Storage

Time	Arrive	Depart
0500 - 0600	109	148
06:00 - 0700	162	222
0700 - 08:00	162	222
08:00 - 09:00	53	73
16:00 - 17:00	222	162
17:00 - 18:00	222	162
18:00 - 19:00	221	162
Daily	1153	1153

- 3.3.21 The following assumptions have been considered to ensure that the assessment is robust and considers worst-case conditions:
- Assumed consented development flows are 7 days per week;
 - Exhaust release level assumed to be at 0 m;
 - Velocity of emissions assumed to be 0.1 m/s; and
 - Total consented development trips assumed to be cold starts.
- 3.3.22 Cold start emissions include excess emissions from the ignition of vehicles following a prolonged period of being parked. This assessment has considered cold starts for all vehicles entering and leaving the development.
- 3.3.23 The derivation of cold start emissions are set out in Appendix E.

³² Department for Environment, Food & Rural Affairs. NO_x to NO₂ Calculator. Accessible at: <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

³³ National Atmospheric Emissions Inventory. Data. Accessible at: <https://naei.beis.gov.uk/data/>

Verification Process

- 3.3.24 Whilst the ADMS-Roads model is widely accepted for its use in assessments of this nature, it is still important that a model verification process is undertaken to confirm that the model's performance is within an acceptable margin of error. Therefore, a comparison of modelled results with monitored results has been undertaken in line with LAQM.TG(16).
- 3.3.25 The model was found to be under-predicting compared to the monitored concentrations, which is not unusual. Therefore, adjustment factors have been derived.
- 3.3.26 The model verification process is set out in [Appendix C](#).

Modelling Uncertainty

- 3.3.27 There are many uncertainties when considering both measured and predicted pollution concentrations. The model is dependent upon the traffic data provided for the project, and should this be subject to change, so may the resulting pollution concentrations.
- 3.3.28 The background air quality concentrations have been taken from the DEFRA background mapping. The DEFRA website³⁴ includes estimated background air pollution data for NO_x, NO₂, PM₁₀ and PM_{2.5} for each 1km by 1km OS grid square. Background pollutant concentrations are modelled from the base year of 2018 and based on ambient monitoring and meteorological data from 2018. The 2018 mapping includes projections for future years, up to currently 2030. Furthermore, the concentrations are modelled at a standard 'living height,' which has been averaged across the grid square.
- 3.3.29 There is discrepancy between the concentrations mapped by DEFRA and those recorded at local background sites. Therefore, where data for local background sites is available, they have been used to calibrate air pollution concentrations, which has been utilised for this AQA. To note, factors are not available for PM₁₀ and PM_{2.5}.
- 3.3.30 Due to the ongoing uncertainty regarding 2020 air quality monitoring data as a result of the COVID-19 global pandemic, and to ensure a conservative assessment of future exposure and impacts is made, the verification process has used 2019 monitoring data. This is supported by DEFRA and Greater London Authority (GLA), which published the LAQM Covid-19: Supplementary Guidance³⁵, which states:

"An option would be to exclude the use of 2020 as a verification year, certainly until such time as it becomes clearer what the longer-term impacts of COVID-19 are / have been. The use of 2019 as a verification year would be recommended under such a direction, as the most recent year available without the effects of the pandemic. However, there are uncertainties as to whether changes to trends in both road traffic emissions and background concentrations have taken place and whether any changes would be likely to lead to longer-term shifts. This in turn could also lead to challenges and cost implications on LAQM projects (e.g. detailed modelling assessments, AQAPs) whose outcomes would be based on this more conservative approach in contravention, it could be argued, of real-world observations."

- 3.3.31 The emissions factors within the latest DEFRA Emission Factor Toolkit (EFT) are based on assumptions which were current before the occurrence of the Covid-19 pandemic. As such, this data will not reflect any changes that have occurred or may occur in the future as a result of behavioural change caused by

³⁴ Department for Environmental Food and Rural Affairs. Accessible at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>

³⁵ Department for Environment, Food & Rural Affairs, 2021. LAQM Covid-19: Supplementary Guidance.

the pandemic and / or as a result of measures implemented by governing authorities (e.g. lockdowns, travel restrictions etc.).

3.3.32 This is highlighted by a recent statement published by DEFRA, which states:

“Users of the updated LAQM tools should be aware that the projections in the 2018 reference year background maps and associated tools are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these tools do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.”

3.4 Significance Impact Criteria

Construction Impacts

3.4.1 The IAQM (2016) guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, (as set out in [Section 7](#) and [Appendix D](#)) the IAQM (2016) guidance is clear that the residual effect will normally be ‘not significant.’

Operational Impacts

3.4.2 Currently there is no formal guidance on the absolute magnitude and significance criteria for the assessment of air quality impacts. However, the EPUK & IAQM (2017) guidance recommendations for describing the impact at individual receptor locations as set out in [Table 3.4](#), which has been utilised to determine the description of any impact.

Table 3.4: Operational Impact Descriptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in concentration relative to Air Quality Action Level (AQAL)				
	<0.5	1	2 – 5	6 – 10	>10
75% or less of AQAL	Negligible	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Negligible	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Negligible	Moderate	Substantial	Substantial	Substantial
Notes: • Values are rounded to the nearest whole number. • When defining the concentration as a percentage of the AQAL, use the ‘without scheme’ concentration where there is a decrease in pollutant concentration and the ‘with scheme,’ concentration for an increase. • AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency ‘Environmental Assessment Level (EAL).’					

3.4.3 The EPUK & IAQM (2017) advice provides guidance on the severity of an impact as a descriptor. However, although the impacts might be considered ‘Slight,’ ‘Moderate’ or ‘Substantial’ at one or more receptor location, the overall effects of a Proposed Development may not always be judged as being significant.

3.4.4 The guidance believes that the assessment of significance should be based on professional judgement, with the overall air quality impact of the scheme / Proposed Development described as either significant or not significant. In drawing this conclusion, the following factors should be taken into account:

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

3.4.5 The judgement of the significance should be made by a competent professional who is suitably qualified.

Introduction of Residential Receptors

3.4.6 The significance of emissions for the introduction of residential receptors will be determined by comparing the predicted results to the Air Pollution Exposure Criteria (APEC) detailed in the Air Quality and Planning Guidance³⁶ written by the London Air Pollution Planning and the Local Environment (APPLE) working group. The Air Pollution Exposure Criteria is a recognised approach to describe the significance of the impacts predicted, together with an indication as to the level of mitigation required in order for a development to be approved. The APEC table is replicated in [Table 3.5](#) below.

Table 3.5: Air Pollution Exposure Criteria (APEC)

APEC	NO ₂	PM ₁₀	Recommendations
A	>5% below national annual mean objective	>5% below national annual mean objective >1-day less than national 24-hour objective	No air quality grounds for refusal; however, mitigation of any emissions should be considered.
B	Between 5% below or above national annual mean objective	Between 5% above or below national annual mean objective Between 1-day above or below national 24-hour objective	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered.
C	>5% above national annual mean objective	>5% above national annual mean objective >1-day more than national 24-hour objective	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated

³⁶ The London Air Pollution Planning and the Local Environment (APPLE) working group, 2007. *Air Quality and Planning Guidance*.

4 Baseline Conditions

4.1 Air Quality Review and Assessment

- 4.1.1 Under the Air Quality Strategy, there is a duty on all local authorities to consider the air quality within their boundaries and to report annually to DEFRA.
- 4.1.2 LAQM has been assessed by GMCA through the national Review and Assessment process and in fulfilment of Part IV of the Environmental Act 1995.
- 4.1.3 At the time of writing RMBC has declared one AQMA within the council boundaries, declared for exceedances of the NO₂ annual mean objective. The AQMA is declared for an area based on a number of both major and minor roads in the borough, including the M60, M62, A58, A664, A6033 and B6255. To note, the Application Site is not located within this AQMA.

4.2 Local Air Quality Monitoring

- 4.2.1 RMBC have a network of non-automatic monitoring stations (diffusion tubes) located across the jurisdiction; a review of the latest Annual Status Report (ASR)³⁷ indicates that diffusion tube monitoring was undertaken near to the Application Site.
- 4.2.2 [Table 4.1](#) sets out the NO₂ monitoring data collected for the past 5 years for the closest monitoring locations to the Application Site, as illustrated in [Figure 4.1](#).

Table 4.1: Summary of NO₂ Annual Mean Air Quality Monitoring

ID	Type	Annual Mean (µg/m³)				
		2016	2017	2018	2019	2020
Diffusion Tubes						
RO15ANO	Roadside	32.8	29.7	24.2	27.0	20.3
RO16ANO	Urban Background	29.9	26.3	22.6	19.9	18.8
RO17ANO	Urban Background	25.6	25.7	36.1	23.5	18.5
RO22ANO	Roadside	-	-	28.6	43.4	31.5
RO23ANO	Roadside	-	-	-	37.8	27.6
Objective				40		
Notes:						
Bold indicates exceedances of the NO ₂ annual mean objective. <u>Bold and underlined</u> indicates exceedances of 60 µg/m ³ (which is an indication the hourly mean objective could be being breached).						

³⁷ Greater Manchester Combined Authority, 2021. *2021 Air Quality Annual Status Report (ASR)*.

Figure 4.1: Monitoring Locations



4.2.3 The air quality monitoring carried out near to the Application Site shows a general compliance of the NO₂ annual mean objective, for the past 5 years of available data, though an exceedance was reported at monitor RO22ANO in 2019. However, since this monitor is located near to the busy A664/Oldham Road crossroads, it was not considered representative of concentrations at the Application Site. It should be noted that 2020 concentrations have been impacted as a result of the COVID-19 pandemic.

4.3 Mapped Background Concentrations

[DEFRA Background Concentrations](#)

- 4.3.1 The DEFRA website includes estimated background air pollution data for NO_x, NO₂, PM₁₀ and PM_{2.5} for each 1km-by-1km OS grid square. Background pollutant concentrations are modelled from the base year of 2018 and based on ambient monitoring, meteorological data from 2018 and then projected for future years. Projected pollutant concentrations for the verification and baseline and assessment year of 2019, covering the closest OS grid square to the chosen receptor locations, are provided in [Table 4.2](#) and have been utilised within this AQA.
- 4.3.2 As per a recent statement from DEFRA, as set out in [paragraph 3.5.26](#), the DEFRA background concentrations do not consider short term variations as a result on the Covid-19 outbreak in the UK:

Table 4.2: Estimated Annual Mean Background Pollutant Concentrations ($\mu\text{g}/\text{m}^3$)

Pollutant	2019	2023
NO ₂	20.1	16.8
PM ₁₀	12.6	12.1
PM _{2.5}	8.2	7.8

Notes: Data presented are derived from the ordinance survey grid references for receptors identified in Table 3.1.

- 4.3.3 Annual mean concentrations are within the relevant objective limits for NO₂, PM₁₀ and PM_{2.5}.
- 4.3.4 Background NO₂ concentrations have been calibrated against data measured in 2019 at three diffusion tube urban background monitoring sites within RMBC. To note, eight diffusion tubes listed as urban background by RMBC were omitted due to close proximity to sources.
- 4.3.5 Measured annual mean NO₂ concentrations at these monitoring locations have been compared against the annual mean concentration predicted by DEFRA's background maps to find an average calibration factor. The calibration factor is then applied to the DEFRA background concentration.
- 4.3.6 The Background Calibration Factors are set out in Table 4.3.

Table 4.3: Background Calibration Factors

Monitoring Sites	NO ₂ ($\mu\text{g}/\text{m}^3$)		
	Measured Concentration	Mapped Concentration	Calibration Factor
RO3ANO	22.1	21.0	1.1
RO10ANO	17.7	15.3	1.2
RO13ANO	17.2	12.5	1.4
Average Calibration Factor			1.2

Notes: Data rounded.
Mapped concentrations taken from the closest grid square derived from the DEFRA background maps for 2019.

4.4 Modelled Baseline Concentrations

- 4.4.1 The modelled baseline concentrations are set out in Table 4.3 for the 2019 'future baseline' scenario, for the receptor locations as set out in Table 3.1 and illustrated in Figure 3.1. and Figure 3.2.

Table 4.4: 2019 NO₂, PM₁₀ and PM_{2.5} Concentrations at Specified Receptors

Receptor	Calculated Annual Mean (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
R1	26.1	13.6	9.1
R2	32.2	14.3	9.5
R3	35.0	15.5	10.2
R4	36.4	15.7	10.3
R5	33.6	15.2	10.0
R6	27.8	13.5	9.1
R7	36.7	15.2	10.0
RO23ANO	37.5	15.1	10.0
S1	29.8	13.9	9.2
S2	32.6	14.9	9.9
S3	24.5	13.2	8.9
Objective	40	40	20
Note: Bold indicates exceedance of the annual mean objectives.			

- 4.4.2 The modelled annual mean concentrations for NO₂, PM₁₀ and PM_{2.5} are all below the respective annual mean objective. The annual mean NO₂ concentrations are all below 60 µg/m³, which is regarded to be an indicator that the hourly mean objective will also not be breached.
- 4.4.3 The annual mean PM₁₀ concentrations are below 32 µg/m³ and it is therefore unlikely that the 24-hour mean PM₁₀ objective will be exceeded.

5 Dust Impact Assessment

5.1 Introduction

- 5.1.1 The assessment of construction activities has focused on demolition, earthworks, construction and trackout activities at the site. in line with the IAQM (2016) guidance methodology (as set out in [Appendix A](#)). A summary of the assessment is provided below.

5.2 Screening for a Full Assessment

- 5.2.1 Having reviewed the site location, it is evident that the site has a number of human receptors within 350 m of the site boundary, therefore a detailed dust impact assessment is required.
- 5.2.2 A review of the DEFRA Magic website³⁸ indicates that no ecological site is present within the immediate surrounding area. The closest ecological site is Rochdale Canal SSSI, which sits approximately 1.1 km north of the Application Site. As per box 1 of the IAQM (2016) guidance, it is not within 50 m of the boundary of the site or construction vehicular routes (up to 500 m from the site), therefore, an assessment of the impact of the construction phase on this receptor has been scoped out.

5.3 Potential Dust Emission Magnitude

Demolition

- 5.3.1 A review of the Application Site indicates that one structure will require demolition; however, the majority of the Application Site is vacant and undeveloped. The volume of this structure is unknown; however, it will be < 20,000 m³. Furthermore, the building material is not expected to be of dusty material. Therefore, in line with [Table A 1](#) as set out in [Appendix A](#), and professional judgment, the magnitude of potential dust release from demolition activities is classified as **Small**.

Earthworks

- 5.3.2 The total area where earthworks will occur is greater than 10,000 m². It is anticipated that the soil exiting in the ground has a 'sandy'³⁹ texture, which is not anticipated to be prone to suspension due to large particle size. Therefore, in line with [Table A 1](#) as set out in [Appendix A](#), and professional judgment, the magnitude of potential dust release from demolition activities is classified as **Large**.

Construction

- 5.3.3 The total building volume to be constructed is unknown, however, it is known that the building footprint is 6,532 m², therefore it is anticipated that total building volume will be between 25,000 – 100,000 m³. When considering the construction material may be of high dust potential and size of the Proposed Development, in line with [Table A1](#) as set out in [Appendix A](#) and professional judgement, the magnitude of potential dust release from construction activities is classified as **Medium**.

Trackout

- 5.3.4 The number of daily HGV vehicles movements which may trackout dust and dirt for the construction phase of the Proposed Development is unknown, but it is considered that there would be between 10 –

³⁸ Natural England. MAGIC. Accessible at: <https://magic.defra.gov.uk/>

³⁹ Cranfield Soil and Agrifood Institute. Soilscales. Accessible at: <http://www.landis.org.uk/soilscales/>

50 HGV movements per day. Therefore, in line with [Table A 1](#) as set out in [Appendix A](#), and professional judgment, the magnitude of potential dust release from demolition activities is classified as **Medium**.

[Summary](#)

5.3.5 [Table 5.1](#) summarises the dust emission magnitude for the Proposed Development.

[Table 5.1: Summary of Dust Emission Magnitude](#)

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

5.4 Sensitivity of Area

5.4.1 Step 2B considers the number and the sensitivity of the receptors. A consideration is also made for the background PM₁₀ concentrations when looking at human health impacts (which is based upon the DEFRA background concentrations in [Table 4.2](#)). Buffer zones are set out in [Figure 5.1](#) and [Figure 5.2](#) to illustrate the number of receptors in proximity to the site that could be impacted by dust as a result of the demolition and construction activities.

[Effects of Dust Soiling](#)

- 5.4.2 The presence of between 10-100 'High' sensitivity human (residential) receptors within approximately 20 m of the Application Site boundary, indicates that the area around the construction site has a '**High**' sensitivity (Based upon [Table A3](#) in [Appendix A](#)) for demolition and construction activities.
- 5.4.3 The routing of construction vehicles is expected to be northbound out of the site on Broad Lane. Therefore, receptors have been considered along this road up to 200 m north of the Application Site access. For trackout, there is between 10-100 'High' sensitivity human (residential) receptors within 20 m of where trackout may occur (for a distance of up to 200m from the site entrance). This would be considered a '**High**' sensitivity (Based upon [Table A3](#) in [Appendix A](#)).

[Effects on Human Health](#)

- 5.4.4 The presence of between 10-100 'High' sensitivity human (residential) receptors within approximately 20 m of the site boundary, and the background PM₁₀ concentrations being under 24 µg/m³ (as set out in [Table 4.2](#)), would indicate that the area has a '**Low**' sensitivity for demolition and construction activities (Based upon [Table A4](#) in [Appendix A](#)).
- 5.4.5 The routing of construction vehicles is expected to be northbound, out of the site on Broad Lane. Therefore, receptors have been considered along this road up to 200 m north of the Application Site access. For trackout, there are between 10-100 'High' sensitivity human (residential) receptors within 50 m of where trackout may occur (for a distance of up to 200 m from the site entrance). Along with the background PM₁₀ concentrations being below 24 µg/m³ (as set out in [Table 4.2](#)), it would indicate the area will have a '**Low**' sensitivity (Based upon [Table A4](#) in [Appendix A](#)).

Figure 5.1: Demolition & Construction Dust Risk Buffers

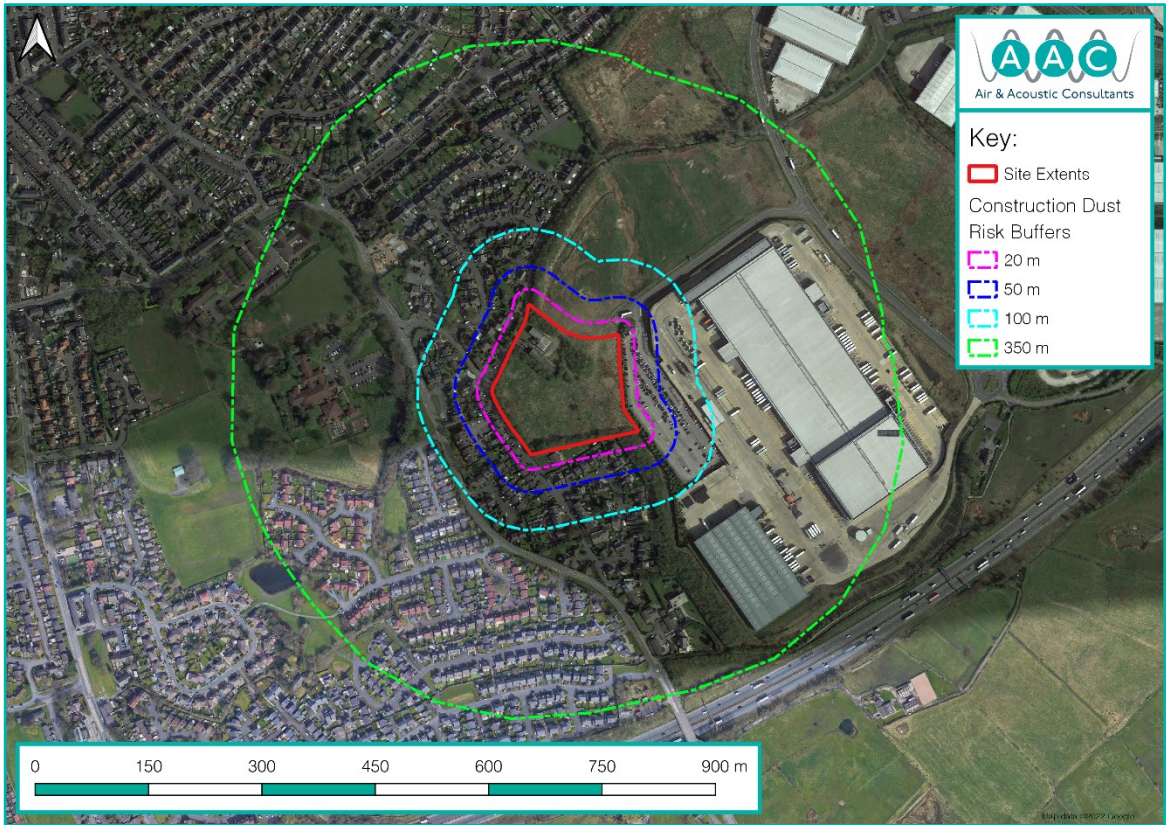
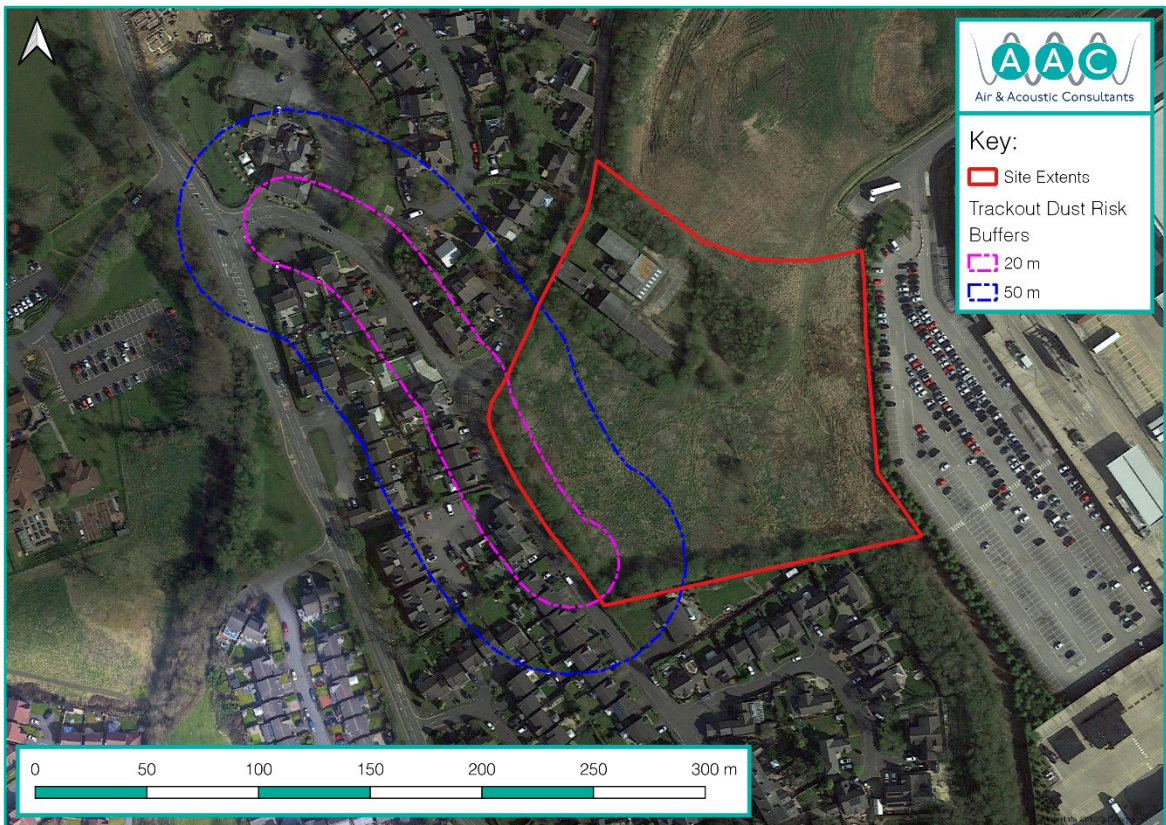


Figure 5.2: Trackout Dust Risk Buffers



Effects on Ecological Receptors

- 5.4.6 As discussed earlier in [paragraph 5.2.2](#), the ecological sites element of the assessment has been scoped out based on the screening criteria in box 1 of the IAQM (2016) guidance.

5.5 Risk and Significance

- 5.5.1 The dust emission magnitude (set out in [Table 5.1](#)) is combined with the sensitivity of the area assessment (set out in [Section 5.4](#)), in line with [Table A6](#) of [Appendix A](#). The resulting risk categories for the demolition and construction activities, without mitigation, are set out in [Table 5.2](#).

Table 5.2: Summary of Dust Risk to Define Site-Specific Mitigation

Activity	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	Medium Risk	Medium risk
Human Health	Negligible	Low Risk	Low Risk	Low Risk
Ecological	N/A	N/A	N/A	N/A

- 5.5.2 As previously advised, the IAQM (2016) guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, (as set out in [Section 7](#) and [Appendix D](#)) the IAQM (2016) guidance is clear that the residual effect will normally be '**not significant**.'

6 Operational Impacts

6.1 Traffic Emissions – Existing Receptors

- 6.1.1 As set out in [Section 3](#), the screening process highlighted that a full impact assessment was required for the Proposed Development.
- 6.1.2 The '2019 Baseline' NO₂, PM₁₀ and PM_{2.5} concentrations at the previously specified receptor locations, as set out in [Table 3.1](#) and illustrated in [Figure 3.1](#), and [Figure 3.2](#) have been compared to the '2019 Baseline + Proposed Development' concentrations and the results are set out in [Table 6.1](#), [Table 6.2](#) and [Table 6.3](#). The tables also set out the impact descriptor at each receptor location in line with the assessment matrix set out in [Table 3.4](#).

Table 6.1: Predicted NO₂ Impacts at Specified Receptors

Calculated NO ₂ Annual Mean (µg/m ³)				
Receptor	2019 Baseline	2019 Baseline + Proposed Development	% Change of Objective	Impact Descriptor
R1	26.1	26.1	0%	Negligible
R2	32.2	32.2	0%	Negligible
R3	35.0	35.0	0%	Negligible
R4	36.4	36.4	0%	Negligible
R5	33.6	33.6	0%	Negligible
R6	27.8	27.8	0%	Negligible
R7	36.7	36.7	0%	Negligible
RO23ANO	37.5	37.5	0%	Negligible
S1	29.8	29.8	0%	Negligible
S2	32.6	32.6	0%	Negligible
S3	24.5	24.5	0%	Negligible
Objective			40	
Note: Bold indicates exceedance of the NO ₂ annual mean objective.				

Table 6.2: Predicted PM₁₀ Impacts at Specified Receptors

Calculated PM ₁₀ Annual Mean (µg/m ³)				
Receptor	2019 Baseline	2019 Baseline + Proposed Development	% Change of Objective	Impact Descriptor
R1	13.6	13.6	0%	Negligible
R2	14.3	14.3	0%	Negligible
R3	15.5	15.5	0%	Negligible

Calculated PM ₁₀ Annual Mean (µg/m ³)				
Receptor	2019 Baseline	2019 Baseline + Proposed Development	% Change of Objective	Impact Descriptor
R4	15.7	15.7	0%	Negligible
R5	15.2	15.2	0%	Negligible
R6	13.5	13.5	0%	Negligible
R7	15.2	15.2	0%	Negligible
RO23ANO	15.1	15.1	0%	Negligible
S1	13.9	13.9	0%	Negligible
S2	14.9	14.9	0%	Negligible
S3	13.2	13.2	0%	Negligible
Objective			40	
Note: Bold indicates exceedance of the PM ₁₀ annual mean objective.				

Table 6.3: Predicted PM_{2.5} Impacts at Specified Receptors

Calculated PM _{2.5} Annual Mean (µg/m ³)				
Receptor	2019 Baseline	2019 Baseline + Proposed Development	% Change of Objective	Impact Descriptor
R1	9.1	9.1	0%	Negligible
R2	9.5	9.5	0%	Negligible
R3	10.2	10.2	0%	Negligible
R4	10.3	10.3	0%	Negligible
R5	10.0	10.0	0%	Negligible
R6	9.1	9.1	0%	Negligible
R7	10.0	10.0	0%	Negligible
RO23ANO	10.0	10.0	0%	Negligible
S1	9.2	9.2	0%	Negligible
S2	9.9	9.9	0%	Negligible
S3	8.9	8.9	0%	Negligible
Objective			20	
Note: Bold indicates exceedance of the PM _{2.5} annual mean objective.				

NO₂

6.1.3 The modelled NO₂ concentrations in Table 6.1 show that NO₂ concentration at all specified residential receptor locations are below the annual mean objective (40 µg/m³).

- 6.1.4 Using the matrix in [Table 3.4](#), it can be seen that the impacts associated with the Proposed Development are anticipated to be **negligible (adverse)** at all receptors.
- 6.1.5 Based on the annual average mean concentration at all receptors being below 60 µg/m³, it is unlikely that any receptor identified would experience an exceedance of the 1-hour mean objective.

PM₁₀

- 6.1.6 The modelled PM₁₀ concentrations in [Table 6.2](#) do not predict any exceedances of the annual mean objective (40 µg/m³) at any of the specified receptor locations. Using the matrix in [Table 3.4](#), it can be seen that the impacts are anticipated to be **negligible (adverse)**.
- 6.1.7 For PM₁₀, the following equation can be used to derive the number of days that the 24-hour mean objective (50 µg/m³) is likely to be exceeded.

$$\text{Num. 24-hour exceedances} = -18.5 + 0.00145 \times \text{annual mean}^3 + \left(\frac{206}{\text{annual mean}} \right)$$

- 6.1.8 There are limitations to this calculation, and this is set out in LAQM.TG(16), which states:

“The relationship does have limitations in so far that it should not be applied when the annual mean PM₁₀ concentration is lower than 14.8 µg/m³”.

- 6.1.9 The highest concentration, predicted at Receptor R4, is 15.7 µg/m³. Based on the formula above, this predicts 0.2 exceedance days at this receptor, which is below the 35-days annual limit. It is therefore thought that none of the receptors would be exposed to any material impact from the short-term concentrations of PM₁₀.

PM_{2.5}

- 6.1.10 The modelled PM_{2.5} concentrations in [Table 6.3](#) do not predict any exceedances of the Stage 2 Post 2020 annual mean objective (20 µg/m³) at any of the specified receptor locations. Using the matrix in [Table 3.4](#), it can be seen that the impacts are anticipated to be **negligible (adverse)**.

Significance of Impacts

- 6.1.11 As set out above, the impacts on the receptors associated with the Proposed Development are anticipated to be **negligible (adverse)** for NO₂, PM₁₀ and PM_{2.5} concentrations. The concentrations do not exceed the relevant national objectives as set out in [Table 2.1](#). Based on this, and in accordance with the IAQM (2017) guidance and professional judgement, the impacts can be considered ‘**not significant**.’

6.2 Traffic Emissions – Future Receptors

- 6.2.1 As noted previously, a planning application 21-00608-FUL was granted permission by RMBC to the north of the Application Site. Due to the nature of this consented development, an assessment of the impact of cold starts on future residential receptors at the Application Site has been conducted. In order to assess the impacts of cold starts from this consented development, an area source has been modelled for the ‘2019 Baseline + Proposed Development’ scenario, as well as the access road to the development, James Kearns Avenue.
- 6.2.2 To note, the assessment on cold starts does not include the Asda Distribution Hub (Plot J1); the background air quality concentration have been taken from the DEFRA background mapping, which are modelled from the base year of 2018 and based on ambient monitoring, meteorological data from 2018

and then includes projections for future years, up to currently 2030. It is anticipated that this modelling includes emissions associated with the Asda Distribution Hub (Plot J1), and therefore would be included within the existing and future background concentrations.

6.2.3 The area source and road modelled for the cold start assessment are illustrated in [Figure 6.1](#). The process of deriving emission factors for cold starts is set out in [Appendix E](#).

Figure 6.1: Modelled Sources



6.2.4 The 'Baseline + Proposed Development' NO₂, PM₁₀ and PM_{2.5} concentrations at the worst-case future receptor locations, as set out in [Table 3.2](#) and illustrated in [Figure 3.3](#), are set out in [Table 6.4](#), [Table 6.5](#) and [Table 6.6](#) below. The tables also set out the percentage above or below the respective annual mean objective / target at each receptor location.

Table 6.4: Predicted NO₂ Concentrations at Future Sensitive Receptors

Calculated NO ₂ Annual Mean (µg/m ³)		
Receptor	2019 Concentration	% Objective
FR1	35.6	89%
FR2	33.1	83%
FR3	30.3	76%
FR4	27.8	69%
Objective		40

Table 6.5: Predicted PM₁₀ Concentrations at Future Sensitive Receptors

Calculated PM ₁₀ Annual Mean (µg/m ³)		
Receptor	2019 Concentration	% Objective
FR1	14.6	36%
FR2	14.2	36%
FR3	13.9	35%
FR4	13.6	34%
Objective		40

Table 6.6: Predicted PM_{2.5} Concentrations at Future Sensitive Receptors

Calculated PM _{2.5} Annual Mean (µg/m ³)		
Receptor	2019 Concentration	% Objective
FR1	9.4	47%
FR2	9.2	46%
FR3	9.0	45%
FR4	8.8	44%
Objective		20

NO₂

- 6.2.5 The modelled NO₂ concentrations in Table 6.4 show that NO₂ concentration at all specified future sensitive receptor locations are below the annual mean objective (40 µg/m³).
- 6.2.6 Based on the annual average mean concentration at all reports being below 60 µg/m³, it is unlikely that any receptor identified would experience an exceedance of the 1-hour mean objective.

PM₁₀

- 6.2.7 The modelled PM₁₀ concentrations in Table 6.5 do not predict any exceedances of the annual mean objective (40 µg/m³) at any of the specified future receptor locations.
- 6.2.8 For PM₁₀, the following equation can be used to derive the number of days that the 24-hour mean objective (50 µg/m³) is likely to be exceeded.

$$\text{Num. 24-hour exceedances} = -18.5 + 0.00145 \times \text{annual mean}^3 + \left(\frac{206}{\text{annual mean}} \right)$$

- 6.2.9 There are limitations to this calculation, and this is set out in LAQM.TG(16), which states:

"The relationship does have limitations in so far that it should not be applied when the annual mean PM₁₀ concentration is lower than 14.8 µg/m³".

- 6.2.10 On the basis that all receptors are below 14.8 µg/m³, the formula above cannot be used to inform the number of 24-hour mean objective exceedances. It is assumed that none of the receptors would be exposed to any material impact from the short-term concentrations of PM₁₀.

PM_{2.5}

- 6.2.11 The modelled PM_{2.5} concentrations in [Table 6.6](#) do not predict any exceedances of the Stage 2 Post 2020 annual mean objective (20 µg/m³) at any of the specified future receptor locations.

Significance of Impacts

- 6.2.12 The concentrations do not exceed the relevant national objectives as set out in [Table 2.1](#). Using the APPLE working group Air Pollution Exposure Criteria, as set out in [Table 3.5](#), the modelled air quality concentrations for these receptors fall within **APEC A**, which states:

“No air quality grounds for refusal; however, mitigation of any emissions should be considered.”

- 6.2.13 Inherent mitigation measures have been included within the Proposed Development which would aid in reducing operational impacts, which are set out in [Section 7](#).

6.3 Plant Emissions

- 6.3.1 At this stage, it has not been possible to undertake a quantitative assessment of any operational plant, as it is unknown if any will be proposed.

7 Mitigation Measures

7.1 Construction

- 7.1.1 A dust assessment has been undertaken in [Section 5](#) and the outcome of which has been utilised within this section to advise upon the adequate level of mitigation that will be required.
- 7.1.2 A range of measures are suggested, which could be utilised during the construction phase are set out below. These have been outlined in the IAQM (2016) document, and should be used to reduce the impacts of the construction phase on the local sensitive receptors.
- 7.1.3 Further general guidance on potential mitigation measures can be found in [Appendix A](#).

Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- Bag and remove any biological debris or damp down such material before demolition.

Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilize surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- 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; and
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;

- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site logbook;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsters and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors where possible.

7.2 Operational

Operational Mitigation

7.2.1 The results of the air quality assessment demonstrated that the air quality concentrations at existing residential receptors and in 2019 were compliant with the relevant objectives of NO₂ (40 µg/m³), PM₁₀ (40 µg/m³) and PM_{2.5} (20 µg/m³) at all receptors other than at receptor R3. This receptor exceeded the NO₂ annual mean objective.

7.2.2 It should be noted that the proposed development is anticipated to be having a **negligible (adverse)** impact at all receptors. The impacts on the modelled receptors are considered '**not significant**' as set out previously. Any mitigation measures to aid in reducing impacts should be proportionate to the impact of the proposed development. This is highlighted in the EPUK & IAQM (2017) guidance, which reiterates the PPG, stating:

"Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact"

7.2.3 On the basis the impacts are considered to be '**not significant**' specific measures are not considered necessary.

7.2.4 Furthermore, the significance of the impacts predicted at the proposed future sensitive receptor locations for NO₂ and PM₁₀ concentrations fall within APEC A of the APPLE working group criteria, which states:

"No air quality grounds for refusal; however, mitigation of any emissions should be considered."

7.2.5 Notwithstanding this, some potential mitigation measures are set out in the RMBC (2021) guidance, which could be considered.

8 Summary & Conclusions

8.1 Baseline

- 8.1.1 The Application Site is situated to the off both Broad and Lower Lane, Rochdale. The DEFRA background concentrations set out in [Table 4.2](#) show compliance with the NO₂, PM₁₀ and PM_{2.5} annual mean objectives. Air quality monitoring stations within Rochdale show a mixture of compliance and non-compliance to the NO₂ annual mean objective. The modelled baseline concentration at the specified receptor locations outlined in [Section 4](#), illustrate that concentrations show compliance with the relevant NO₂, PM₁₀ and PM_{2.5} objectives set out in [Table 2.1](#).

8.2 Demolition & Construction Phase

- 8.2.1 A dust assessment has been undertaken for the demolition and construction phase associated with the Proposed Development, in accordance with IAQM (2016) guidance, as set out in [Section 5](#).
- 8.2.2 Following the successful implementation of the suggested mitigation measures, the residual effects of dust and emissions from demolition and construction activities upon the local area and sensitive receptors, although adverse, will be temporary and '**not significant**'.

8.3 Operational Phase

- 8.3.1 The air quality modelling exercise indicates that the scheme will result in a **negligible (adverse)** impact on baseline air quality concentrations at the specified receptor locations, with concentrations remaining within the relevant objectives as set out in [Table 2.1](#). Therefore, in line with the EPUK & IAQM (2017) guidance and professional judgement, the impacts associated with the development on the modelled receptors are '**not significant**'.
- 8.3.2 The NO₂, PM₁₀ and PM_{2.5} concentrations at the Application Site will remain within the relevant objectives as set out in [Table 2.1](#) meaning they are within acceptable levels to introduce future residential receptors, in line with legislative standards. Furthermore, the levels are within APEC-A, which states "*no air quality grounds for refusal.*"
- 8.3.3 Notwithstanding this some potential mitigation measures are set out in the RMBC (2021) guidance, which could be considered.

8.4 Conclusion

- 8.4.1 The Proposed Development is therefore expected to comply with all relevant national, regional and local air quality policies.

APPENDICES

APPENDIX A—DUST RISK ASSESSMENT METHODOLOGY

The effects associated with the site preparation, earthworks and construction phase of the Proposed Scheme have been determined qualitatively using criteria provided in the IAQM (2016) guidance and professional judgement.

The significance of effects associated with the site preparation, earthworks and construction phase of the Proposed Development has been determined qualitatively and involved the following tasks:

- Evaluation of the proposed Site layout, to evaluate size of the Site and possible site construction activities that could generate dust and PM₁₀, their likely location and duration. No information on the precise construction plan was available at the time of undertaking the current assessment and hence assumptions were made;
- Collection and appraisal of meteorological data related to wind speed, direction and frequency, and precipitation for the local and wider area;
- Identification of any natural shelters, such as trees, likely to reduce the risk of wind-blown dust;
- In the case of PM₁₀, mapping of local background concentrations;
- Assessing the potential distance which the construction traffic will travel across unpaved roads on the construction Site, prior to accessing the local road network (referred to as 'trackout');
- Identification of the location and type of sensitive receptors within 350m of the boundary of the Site and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the Site entrance(s) (at-risk receptors);
- Indication of the number of receptors and sensitivity types at different distances from the Site boundary (or dust generating activities wherever known);
- Assessment of the risk of dust and PM₁₀ effects arising using three risk categories: low risk, medium risk, and high risk. The Site was allocated to a risk category based on two factors:
 - The scale and nature of the works, which determined the magnitude of potential dust emissions classed as: small, medium or large; and
 - The type and proximity of receptors, considered separately for human and ecological receptors, which determined the sensitivity of the area.

The criteria developed by IAQM is divides the activities on construction sites into four different types to assess their different level of impacts upon receptors. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

The assessment procedure includes four steps summarised below:

STEP 1 - SCREENING THE NEED FOR A FULL ASSESSMENT

The following screening criterion has been applied to the assessment: An assessment will normally be required where there is:

- A 'human' receptor within:
 - 350m of the Site boundary; or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).
- An 'ecological' receptor within:
 - 50m of the Site boundary; or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

Should this criterion not be met it can be concluded that the level of risk upon receptors is negligible and therefore the effects are not significant, and therefore no mitigation measures will be required.

STEP 2 - ASSESS THE RISK OF DUST ARISING

The Site is given a risk classification based upon the following two factors:

- The scale and nature of the construction works, to provide the potential dust emission magnitude (Step 2A); and
- The sensitivity of the area / receptors to the dust impacts (Step 2B).

These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

STEP 2A - DEFINE THE POTENTIAL DUST EMISSION MAGNITUDE

The dust magnitude is categorised by the following:

- Small;
- Medium; or
- Large.

The IAQM provide a brief description upon what could apply for each classification (as set out in [Table A 1](#)) and should be based upon professional judgement.

Table A 1: Dust Magnitude Classification

Magnitude Class	Classification Description
Demolition	
Large	Total building volume >50,000 m ³ , potentially dusty material, on-site crushing and screening, activities >20 m above ground level.
Medium	Total building volume 20,000-50,000m ³ , potentially dusty construction material, demolition activities 10-20 m above ground level.
Small	Total building volume <20,000 m ³ , construction material with low potential for dust release, demolition activities <10 m above ground, works during wetter months.
Earthworks	
Large	Total site area over 10,000 m ² , potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved > 100,000 tonnes.
Medium	Total site area between 2,500 to 10,000 m ² , moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 - 8 m in height, total material moved 20,000 to 100,000 tonnes.
Small	Total site area less than 2,500 m ² . Soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 10,000 tonnes earthworks during winter months.
Construction	
Large	Total building volume over 100,000 m ³ , activities include piling, on-site concrete batching, and sand blasting. Period of activities more than two years.

Magnitude Class	Classification Description
Medium	Total building volume between 25,000 and 100,000 m ³ , use of construction materials with high potential for dust release (e.g. concrete), activities include piling, on-site concrete batching. Period of construction activities between one and two years.
Small	Total building volume below 25,000 m ³ , use of construction materials with low potential for dust release (e.g. metal cladding or timber). Period of construction activities less than one year.
Trackout	
Large	> 50 HDV (>3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m. (Trackout may occur up to 500 m from the site entrance).
Medium	10-50 HDV (>3.5 t) outwards movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m. (Trackout may occur up to 200 m from the site entrance).
Small	<10HDV (>3,5 t) outward movements in any one day. (Trackout may occur up to 50 m from the site entrance).

STEP 2B - DEFINE THE SENSITIVITY OF THE AREA

The sensitivity of the area / receptor is defined by taking account of the following factors and the criteria set out in [Table A 2](#) to [Table A 5](#)

- The type of receptors in the area;
- The distance and number of receptors; and
- Background PM₁₀ concentrations.

Table A 2: Defining Receptor Sensitivity

Receptor Sensitivity	Human	Ecological
High	Very densely populated area, 10-100 dwellings within 20 m of site. Annual mean concentrations of PM ₁₀ close to/in exceedance of the national objective (40 µg/m ³). Very sensitive receptors (e.g. residential properties, hospitals, schools, care homes).	Internationally or nationally designated site, the designated features may be affected by dust soiling. A location where there is dust sensitive species present.
Medium	Densely populated area, 1-10 dwellings within 20 m of site. Annual mean concentrations of PM ₁₀ below the national objective (> 28 µg/m ³). Medium sensitivity receptors (e.g. office and shop workers).	Nationally designated site where the features may be affected by dust deposition. A location with a particularly important plant species where its dust sensitivity is unknown.
Low	Sparsely populated area, 1 dwelling within 20 m of site. Annual mean concentrations well below the national objectives (<µg/m ³). Low sensitivity receptors (e.g. public footpaths, playing fields, shopping streets).	Locally designated site where the features may be affected by dust deposition.

Table A 3: Sensitivity of the Area to Effects on People and Property from Dust Soiling

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	Low	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A 4: Sensitivity of the Area to Human Health Effects

Receptor Sensitivity	Annual Mean PM ₁₀	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m ³	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	28 – 32 µg/m ³	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	24 – 28 µg/m ³	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	<24 µg/m ³	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A 5: Sensitivity of the Area to Ecological Effects

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

STEP 2C – DEFINE THE RISK OF IMPACTS

The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts with no mitigation applied. The IAQM provides the matrix in [Table A 6](#) as a method of assigning the level of risk for each activity.

Table A 6: Defining the Risk of Dust Impacts

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

STEP 3 – IDENTIFY THE NEED FOR SITE SPECIFIC MITIGATION

From the identification of the risk of impacts with no mitigation, it is possible to determine the specific mitigation measures that can be applied in relation to the level of risk associated with the construction activity. The

mitigation measures described below are suggested as measures that could be utilised. Specific measures of which are included in [Section 7](#) (and general mitigation measures are set out in [Appendix D](#)) of this report.

STEP 4 – DETERMINE SIGNIFICANT IMPACTS

The IAQM does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant.'

APPENDIX B – TRAFFIC FLOWS

Verification

Table B.1 – 2019 Verification Traffic Flows

Link	Speed (Kph)	2019 Traffic Flows		
		Total Vehicles	HGV	HGV%
A671 Oldham Road (South of Well I' Th' Lane Junction)	48	7275	242	3%
A671 Oldham Road (Southbound at Well I' Th' Lane Junction)	48	3790	133	3%
A671 Oldham Road (Northbound at Well I' Th' Lane Junction)	48	3485	108	3%
A671 Oldham Road (North of Well I' Th' Lane Junction)	48	14842	880	6%
A664 Kingsway	48	16257	509	3%
A664 Queensway	48	21704	706	3%

Traffic Scenarios

Table B.2 – 2019 Future Baseline + Proposed Development Scenario Traffic Flows

Link	Speed (Kph)	2019 Traffic Flows		
		Total Vehicles	HGV	HGV%
A671 Oldham Road (South of Well I' Th' Lane Junction)	48	7423	242	3%
A671 Oldham Road (Southbound at Well I' Th' Lane Junction)	48	3938	133	3%
A671 Oldham Road (Northbound at Well I' Th' Lane Junction)	48	3633	108	3%
A671 Oldham Road (North of Well I' Th' Lane Junction)	48	14990	880	6%
A664 Kingsway	48	16405	509	3%
A664 Queensway	48	21146	706	3%
James Kearns Avenue	20	5664	344	4%

APPENDIX C – VERIFICATION

Model verification studies are undertaken in order to check the performance of dispersion models and, where modelled concentrations are significantly different to monitored concentrations, a factor can be established by which the modelled results can be adjusted in order to improve their reliability. The model verification process is detailed in LAQM.TG(16).

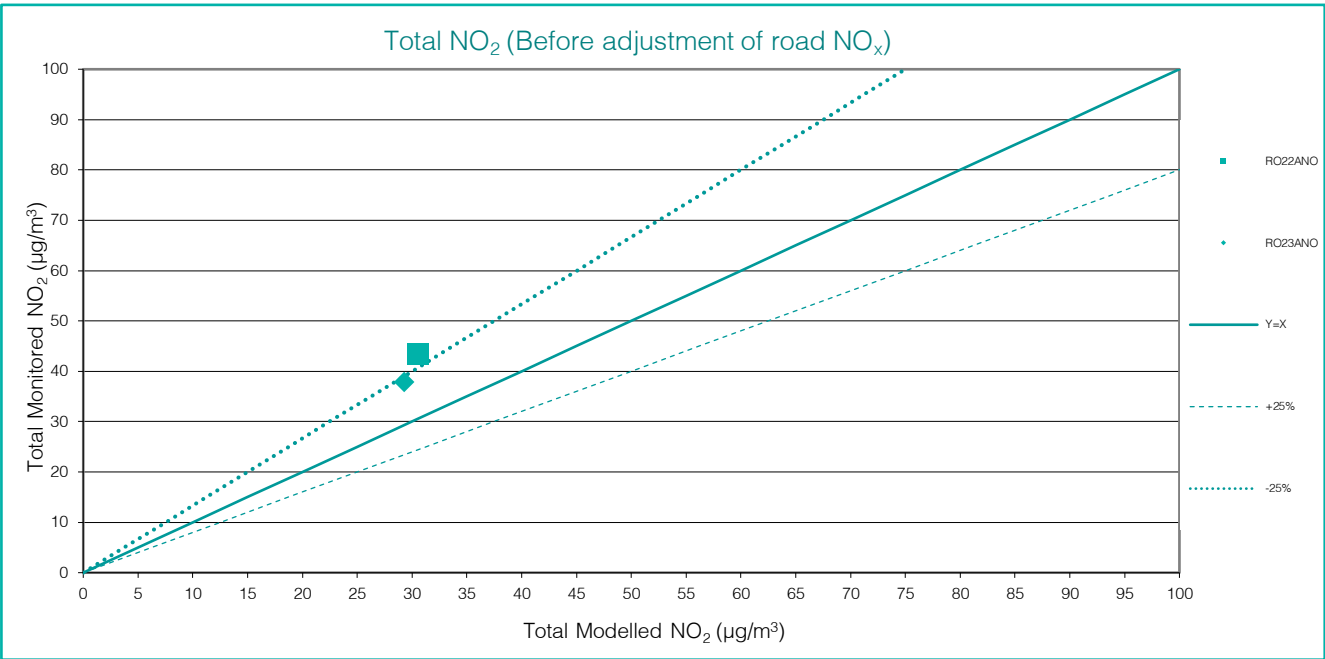
According to TG(16), no adjustment factor is necessary where the results of the model all lie within 25% of the monitored concentrations, but ideally within 10%.

Model verification can only be undertaken where there is sufficient roadside monitoring data in the vicinity of the subject scheme being assessed. TG(16) recommends that a combination of automatic and diffusion tube monitoring data is used; although this may be limited by data availability. For this assessment, two NO₂ diffusion tube site was used to verify against. The monitoring stations are located within the Rochdale AQMA. [Table C.1](#) compares the monitored and modelled NO₂ concentrations at the monitoring locations.

Table C.1: Comparison of Monitored and Modelled NO₂ Concentrations

Site ID	Type	Concentrations (µg/m³)		
		Monitored	Modelled	% Difference
RO22ANO	Diffusion Tube	43.4	30.6	-29.6
RO23ANO	Diffusion Tube	37.8	29.2	-22.7

Figure C.1: Comparison of Monitored and Modelled NO₂ Concentrations Before Adjustment



The data in [Table C.1](#) shows that the model is under-predicting NO₂ concentrations. This is not unusual and is likely to be the result of local dispersion conditions.

As the difference for all of the sites is greater than +/- 10%, an adjustment factor has been derived to ensure a conservative assessment is undertaken.

As it is primary NO_x rather than secondary NO₂ emissions that are modelled, an adjustment factor must be derived for the road contribution of NO_x. A ratio of the modelled versus monitored NO_x concentrations using the least squares statistical method has been undertaken to derive an adjustment factor, as set out in [Table C.2](#).

Table C.2: Deriving the Adjustment Factor

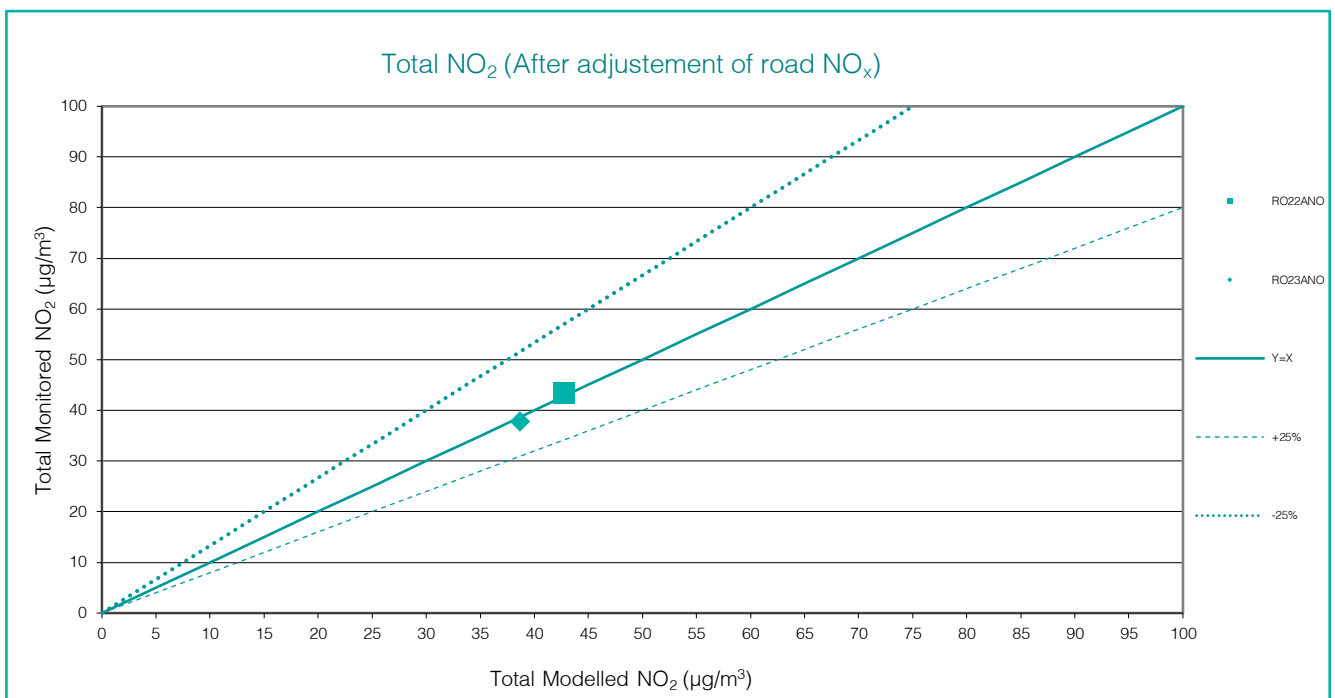
Site	Monitored Road NO _x (µg/m ³)	Modelled Road NO _x (µg/m ³)	Ratio
RO22ANO	48.9	20.9	2.267
RO23ANO	33.5	15.6	

Table C.3 compares monitored and modelled NO₂ concentrations at the monitoring location after the adjustment factor has been applied.

Table C.3: Comparison of Monitored and Adjusted Modelled NO₂ Concentrations

Site ID	Type	Concentrations (µg/m ³)		
		Monitored	Modelled	% Difference
RO22ANO	Diffusion Tube	43.4	42.8	-1.4
RO23ANO	Diffusion Tube	37.8	38.7	2.2

Figure C.2: Comparison of Monitored and Modelled NO₂ Concentrations After Adjustment



The data in Table C.3 shows that all NO₂ concentrations in the model are now within 10% of the monitored concentration, indicating that the model is performing acceptably.

A Root Mean Square Error (RMSE) has been calculated in Table C.4 to determine the error within the calculations before Road-NO_x adjustment, based upon the following calculation:

$$RMSE = \sqrt{\frac{1}{N} \sum_{i=1}^N (obs_i - Pred_i)^2}$$

Table C.4: Root Mean Squared Error

Site	Predictions	Observations	Difference
RO22ANO	42.8	43.4	-0.6
RO23ANO	38.7	37.8	0.9
RMSE:			0.7

The calculated RMSE is $0.7 \mu\text{g}/\text{m}^3$, which correlates to a 1.8% error ratio. The RMSE means that modelled results could be under or over predicting pollution concentrations between $\pm 0.7 \mu\text{g}/\text{m}^3$. The RMSE means that modelled results are acceptable, as they are within the ideal 10% margin of error (as advised in TG(16)), and therefore no adjustment factor is required.

As there are no appropriate PM_{10} or $\text{PM}_{2.5}$ monitoring locations within the study area, the predicted road- PM_{10} and road- $\text{PM}_{2.5}$ components have been adjusted using the road EFT NO_x factor before adding the appropriate background concentration.

APPENDIX D– GENERAL CONSTRUCTION MITIGATION MEASURES

The following highly recommended and desirable best practice measures have been taken from the IAQM (2016) *Guidance on the Assessment of Dust from Demolition and Construction* document. Developers should implement the appropriate dust and pollution control measures set out below to ensure the air quality impacts of construction and demolition are minimised and any mitigation measures employed are effective.

These will need to be written into a dust management plan (DMP), which should be approved by the local planning authority prior to commencement of work on-site. For major sites, the DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan, and compliance monitoring may be required.

The following measures are based on 'High Risk' sites, which has been determined in the Dust Risk Assessment section.

COMMUNICATIONS

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

SITE MANAGEMENT

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book; and
- 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. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

MONITORING

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and

- Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

PREPARING AND MAINTAINING THE SITE

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site ensure they are kept covered; and
- Cover, seed or fence stockpiles to prevent wind whipping.

OPERATING VEHICLE/MACHINERY AND SUSTAINABLE TRAVEL

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (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, where appropriate);
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

OPERATIONS

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

WASTE MANAGEMENT

- No bonfires and burning of waste materials.

APPENDIX E— COLD START EMISSIONS

BASIC LGV FLEET PROJECTIONS (NAEI 2019)

- Petrol LGV – 0.2%
- Diesel LGV – 15.3%

COLD STARTS EMISSIONS PER TRIP

- Petrol
 - NO_x – 0.0493 g/trip
- Diesel
 - NO_x – 0.8179
 - PM_{10} – 0.0205
 - $\text{PM}_{2.5}$ – 0.0205

NUMBER OF COLD STARTS

- Petrol
 - NO_x starts = 33 trips per day / 0.00038 trips per second
- Diesel
 - NO_x starts = 2272 trips per day / 0.02630 trips per second
 - PM_{10} starts = 2272 trips per day / 0.02630 trips per second
 - $\text{PM}_{2.5}$ starts = 2272 trips per day / 0.02630 trips per second

COLD START EMISSIONS PER SECOND

- NO_x Cold Start Emissions – 0.02153 g/s
- PM_{10} Cold Start Emissions – 0.00054 g/s
- $\text{PM}_{2.5}$ Cold Start Emissions – 0.00054 g/s

AVERAGE DISTANCE TRAVELLED IN CAR PARK

- 761 m
- 0.8 km

EMISSION RATES

- Emission Rate from ADMS Roads (assuming 5 kph speed)
 - NO_x – 0.557 g/km/s
 - PM_{10} – 0.036 g/km/s
 - $\text{PM}_{2.5}$ – 0.022 g/km/s
- Emission Rate considering distance travelled
 - NO_x – 0.424 g/s
 - PM_{10} – 0.027 g/s
 - $\text{PM}_{2.5}$ – 0.017 g/s
- Cold Starts Emission Rate
 - NO_x – 0.445 g/s

- PM_{10} – 0.028 g/s
- $PM_{2.5}$ – 0.017 g/s

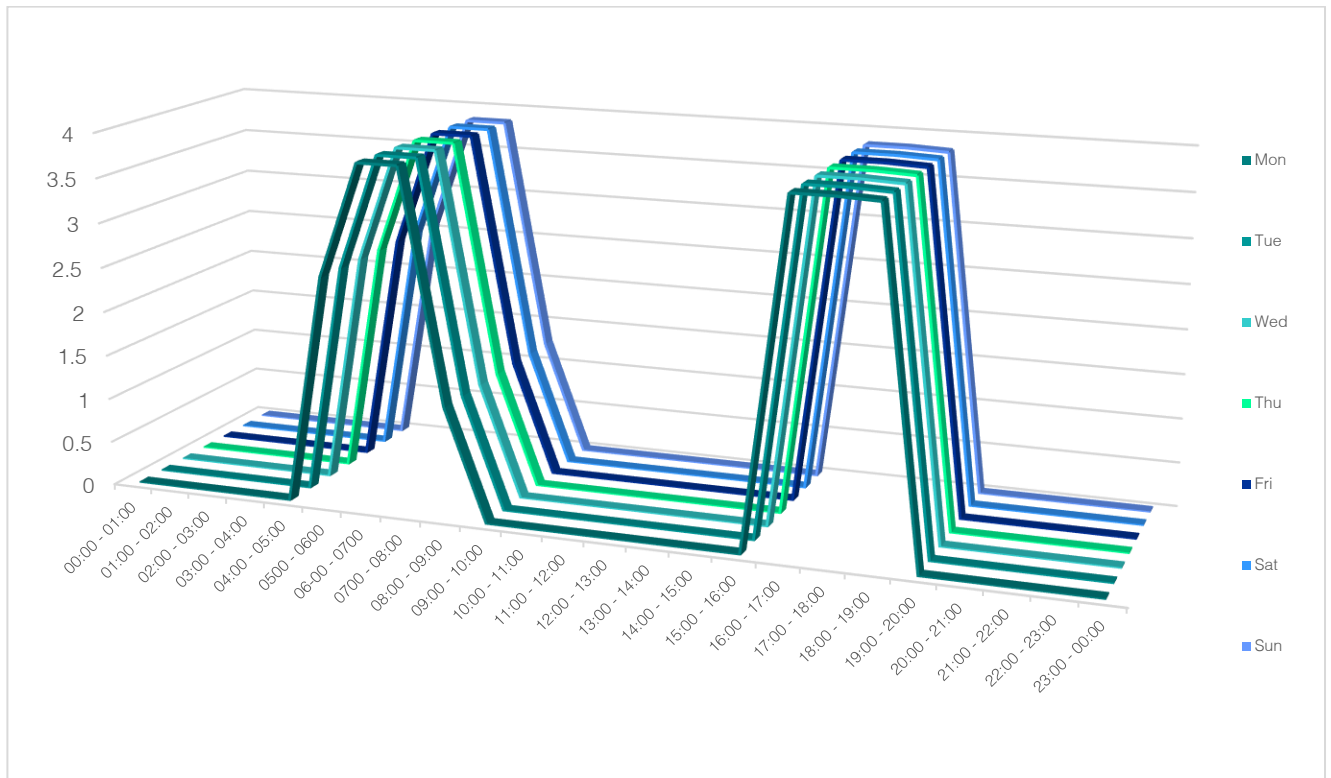
VAN STORAGE AREA

- 43,858 m²

TOTAL VAN STORAGE EMISSION RATE

- NO_x – 1.01556E-05 g/m2/s
- PM_{10} – 6.36921E-07 g/m2/s
- $PM_{2.5}$ – 3.94001E-07 g/m2/s

VAN STORAGE DIURNAL PROFILE





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