



Shinfield Park, Shinfield

Air Quality Assessment

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Prepared for:
Wrenbridge (FRELD Reading) LLP



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Air Quality Assessment
Shinfield Park, Shinfield

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Contents

1	Introduction	3
1.1	Proposed Development	3
1.2	Scope of Assessment	3
2	Legislation, Policy and Guidance	4
2.1	Air Quality Regulations	4
2.2	Air Quality Management	5
2.3	Planning Policy	6
2.4	Assessment Guidance	12
3	Methodology	13
3.1	Introduction	13
3.2	Baseline Air Quality	13
3.3	Construction Dust Impacts	13
3.4	Demolition and Construction Road Traffic Emission Impacts	14
3.5	Demolition and Construction Non-Road Mobile Machinery Emission Impacts	14
3.6	Operational Road Traffic Emission Impacts	15
3.7	Consideration of PM _{2.5}	17
3.8	Assumptions and Limitations	17
3.9	Air Quality Impacts Significance Criteria	17
4	Baseline Environment.....	19
4.1	Site Context.....	19
4.2	Study Area	19
4.3	Sensitive Receptor Locations	19
4.4	Ambient Air Quality	19
4.5	Predicted Background Concentrations.....	21
4.6	Predicted Baseline Concentrations	22
5	Predicted Impacts	23
5.1	Construction Dust Impacts	23
5.2	Demolition and Construction Road Traffic Emission Impacts	24
5.3	Demolition and Construction Non-Road Mobile Machinery Emission Impacts	25
5.4	Operational Phase Road Traffic Emission Impacts	25
5.5	Site Suitability	27
5.6	Consideration of PM _{2.5}	28
5.7	Effect Significance	28
6	Mitigation.....	29
6.1	Construction	29
6.2	Operation.....	31
6.3	Mitigation of PM _{2.5} Emissions and Exposure	31
7	Summary and Conclusions	32
	References.....	33



Tables

Table 2-1 Relevant Air Quality Objectives / limit values	4
Table 2-2 Relevant Public Exposure	6
Table 3-1 Impact Significance Criteria	17
Table 4-1 Measured Annual Mean NO ₂ Concentrations 2019 – 2023	20
Table 4-2 Estimated Annual Mean Background Concentrations	21
Table 4-3 Predicted Baseline Concentrations of NO ₂ , PM ₁₀ and PM _{2.5} in 2023 and 2027	22
Table 5-1 Dust Emissions Magnitudes	23
Table 5-2 Risk of Construction Dust Impacts without Mitigation	24
Table 5-3 Predicted Concentrations of NO ₂ (µg/m ³), % Change and Impact at each Receptor in 2027 – Reference Scenario.....	26
Table 5-4 Predicted Concentrations of PM ₁₀ (µg/m ³), % Change and Impact at each Receptor in 2027 – Reference Scenario.....	26
Table 5-5 Predicted Concentrations of PM _{2.5} (µg/m ³), % Change and Impact at each Receptor in 2027 – Reference Scenario.....	26
Table 5-6 Predicted Concentrations of NO ₂ (µg/m ³), % Change and Impact at each Receptor in 2027 – Option 1 Scenario.....	27
Table 5-7 Predicted Concentrations of PM ₁₀ (µg/m ³), % Change and Impact at each Receptor in 2027 – Option 1 Scenario.....	27
Table 5-8 Predicted Concentrations of PM _{2.5} (µg/m ³), % Change and Impact at each Receptor in 2027 – Option 1 Scenario.....	27
Table 6-1 Construction Phase Mitigation Measures	29
Table B-1 Dust Emission Magnitude Classification	36
Table B-2 Receptor Sensitivity	36
Table B-3 Sensitivity of an Area to Dust Soiling Effects	37
Table B-4 Sensitivity of an Area to Human Health Impacts	37
Table B-5 Sensitivity of an Area to Ecological Impacts	38
Table B-6 Risk of Dust Impacts Calculation Matrix	38

Appendices

Appendix A	Glossary
Appendix B	IAQM Dust Guidance (2024) Approach
Appendix C	EPUK / IAQM Guidance (2017) Screening Criteria
Appendix D	Model Inputs and Results Processing
Appendix E	Model Verification
Appendix F	Figures



1 Introduction

1.1 Proposed Development

- 1.1.1 Wrenbridge (FRELD Reading) LLP (the 'Applicant') has commissioned Stantec to undertake an air quality assessment to support a planning application for a commercial development at Shinfield Park, Reading, located to the north of the B3270 (the 'Site'). The Site is located within the administrative boundary of Wokingham Borough Council (WBC).
- 1.1.2 The planning application is for the '*redevelopment of the Site for flexible employment use (Use Class E(g)(ii)-(iii)/B2/B8) together with associated servicing areas, parking, landscaping and other associated works (including demolition)*' (the 'Proposed Development').

1.2 Scope of Assessment

- 1.2.1 This report describes existing air quality within the study area, assesses the impact of the construction and operation of the Proposed Development on air quality in the study area, and qualitatively considers the suitability of the Site for the proposed end-use.
- 1.2.2 The main air pollutants of concern during the construction period are emissions of dust and fine particulate matter (PM₁₀) associated with on-site demolition and construction activities and off-site trackout. Additionally, there is the potential for emissions of nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}) from construction related traffic.
- 1.2.3 The main air pollutants of concern during the operational period are NO₂, PM₁₀ and PM_{2.5} emissions associated with proposed and existing road traffic.
- 1.2.4 The quantity and distribution of vehicle trips generated by the Proposed Development has been derived using outputs from a transport model managed by WBC, provided by the Project's transport consultants, Icen Projects. At a previous stage, an interim baseline assessment was undertaken before outputs from the WBC transport model were available. This report contains the full assessment of these traffic flows.
- 1.2.5 The detailed energy strategy for the Proposed Development contains no centralised combustion-based heating or power plant, and technologies will be all-electric (such as solar photovoltaics). Therefore, emissions to air associated with centralised energy generation have been scoped out of further assessment in this report.
- 1.2.6 There are no ecological sites located within 200 m of roads predicted to see a significant increase in traffic as a result of the Proposed Development, therefore no further assessment of ecological impacts resulting from construction or operational road traffic impacts is required.
- 1.2.7 The assessment has been prepared taking into account the requirements of relevant local and national guidance, policy and legislation.



2 Legislation, Policy and Guidance

2.1 Air Quality Regulations

- 2.1.1 The Air Quality (England) Regulations 2000 (AQR) defined National Air Quality Objectives (NAQOs, a combination of concentration-based thresholds, averaging periods and compliance dates) for a limited range of pollutants. Subsequent amendments were made to the AQR in 2001 and 2002 to incorporate 'limit values' and 'target values' for a wider range of pollutants as defined in European Union (EU) Directives.
- 2.1.2 These amendments were consolidated by the Air Quality Standards Regulations 2010 (AQSR) (with subsequent amendments most notably in 2016 and for the devolved administrations), which transposed the EU's Directive on ambient air quality and cleaner air for Europe (2008/50/EC) (European Parliament, Council of the European Union, 2008).
- 2.1.3 Following the Transition Period after the UK's departure from the EU in January 2020, the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (and subsequent amendments for the devolved administrations) have amended the Air Quality Standards Regulations 2010 to reflect the fact that the UK has left the EU. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 amended the PM_{2.5} limit value in the AQSR to 20 µg/m³.
- 2.1.4 The relevant NAQOs and limit values for this assessment are shown in **Table 2-1**.

Table 2-1 Relevant Air Quality Objectives / limit values

Pollutant	Time Period	Objectives	Source
NO ₂	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year	NAQO and AQSR limit value
	Annual mean	40 µg/m ³	NAQO and AQSR limit value
PM ₁₀	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year	NAQO and AQSR limit value
	Annual mean	40 µg/m ³	NAQO and AQSR limit value
PM _{2.5}	Annual mean	20 µg/m ³	NAQO and AQSR limit value

- 2.1.5 The NAQOs for NO₂ and PM₁₀ were to have been achieved by 2005 and 2004 respectively, but also continue to apply in all future years thereafter.
- 2.1.6 The 2019 Clean Air Strategy includes a commitment to set a “*new, ambitious, long-term target to reduce people's exposure to PM_{2.5}*” which the Environment Act 2021 (Statutory Instrument, 2021) commits the Secretary of State to setting. Two PM_{2.5} targets were published via The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 and are set out below:
- an annual mean concentration target for PM_{2.5} levels in England to be 10 µg/m³ or below by 2040; and
 - a population exposure reduction target for a reduction in PM_{2.5} population exposure of 35% compared to 2018 to be achieved by 2040.



- 2.1.7 The Government has published an Environmental Improvement Plan 2023 (Department for Environment, Food and Rural Affairs (DEFRA), 2023a) which sets out the following interim PM_{2.5} targets to be met by the end of January 2028:
- the highest annual mean concentration in the most recent full calendar year must not exceed 12 µg/m³ of PM_{2.5}; and
 - compared to 2018, the reduction in population exposure to PM_{2.5} in the most recent full calendar year must be 22% or greater.
- 2.1.8 DEFRA is developing guidance to ensure that the above PM_{2.5} targets are appropriately considered in planning applications and planning decisions. Interim guidance (DEFRA, 2024a) has been published, requiring applicants to evidence that key sources of air pollution have been identified within their schemes and appropriate action taken to minimise exposure to and emissions of PM_{2.5} as far as reasonably practicable.

National Air Quality Plan for NO₂ in the UK

- 2.1.9 The National Air Quality Plan for NO₂ (DEFRA, 2018) sets out how the Government plans to deliver reductions in NO₂ throughout the UK, with a focus on reducing concentrations to below the EU limit values throughout the UK within the “*shortest possible time*”.
- 2.1.10 The Plan requires all local authorities in England which DEFRA identified as having exceedances of the limit values in their areas past 2020 to develop local plans to improve air quality and identify measures to deliver reduced emissions, with the aim of meeting the limit values within their area within ‘the shortest possible time’. Potential measures include changing road layouts, encouraging public and private ultra-low emission vehicle (ULEV) uptake, the use of retrofitting technologies and new fuels and encouraging public transport. In cases where these measures are not sufficient to bring about the required change within ‘the shortest possible time’ then local authorities may consider implementing access restrictions on more polluting vehicles (e.g. Clean Air Zones (CAZs)).

2.2 Air Quality Management

The Air Quality Strategy

- 2.2.1 Part IV of the Environment Act 1995 (Statutory Instrument, 1995) required the Secretary of State to prepare and publish a ‘strategy’ regarding air quality.
- 2.2.2 The Air Quality Strategy (2007) establishes the policy framework for ambient air quality management and assessment in the UK (DEFRA in partnership with the Scottish Executive, The National Assembly for Wales and the Department of the Environment for Northern Ireland, 2007). The primary objective of the Air Quality Strategy is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Air Quality Strategy sets out the NAQOs and Government policy on achieving these.
- 2.2.3 The Environment Act required an updated Air Quality Strategy, and the Air Quality Strategy (DEFRA, 2023b) sets out six priorities including boosting active travel and public transport. The Air Quality Strategy sets out the Government policy on achieving the NAQOs, including the new targets for PM_{2.5}.
- 2.2.4 The Clean Air Strategy (2019) aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy aims to create a stronger and more coherent framework for action to tackle air pollution (DEFRA, 2019).



Local Air Quality Management

- 2.2.5 Part IV of the Environment Act 1995 (Statutory Instrument, 1995) introduced a system of Local Air Quality Management (LAQM) which requires local authorities to regularly and systematically review and assess air quality within their boundary. In addition, local authorities are required to appraise development and transport plans against these assessments.
- 2.2.6 Where an NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the NAQOs within its AQMA.
- 2.2.7 The Local Air Quality Management Technical Guidance 2022 ((LAQM.TG(22); (DEFRA, 2022)), issued by the Department for Environment, Food and Rural Affairs (DEFRA) for local authorities provides advice on where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year) as summarised in **Table 2-2**.

Table 2-2 Relevant Public Exposure

Averaging Period	NAQOs should apply at:	NAQOs do not apply at:
Annual mean	All locations where members of the public might be regularly exposed. For example: Building façades of residential properties, schools, hospitals, care homes etc	Façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residences. Kerbside sites. Any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean NAQO would apply, together with hotels and gardens of residences.	Kerbside sites. Any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean NAQOs apply as well as: Kerbside sites. Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside locations where the public would not be expected to have regular access.

2.3 Planning Policy

National Planning Policy

- 2.3.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities and Local Government (MHCLG), 2024). The following paragraphs are considered relevant from an air quality perspective.



2.3.2 Paragraph 109 on promoting sustainable transport states:

“Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: ...

f) identifying, assessing and taking into account the environmental impacts of traffic and transport infrastructure – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains.”

2.3.3 Paragraph 110 goes on to state:

“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.”

2.3.4 Paragraph 187 on conserving and enhancing the natural environment 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 stability. 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, and...”

2.3.5 Paragraph 198 within ground conditions and pollution 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.”

2.3.6 Paragraph 199 states that:

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

2.3.7 Paragraph 200 states that:

“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed”.



National Planning Practice Guidance

- 2.3.8 Paragraph 005, Reference 32-005-20191101 (revision date 01.11.2019), of the Planning Practice Guidance (PPG) (MHCLG, 2019) provides guidance on how considerations regarding air quality can be relevant to the development management process as follows:

"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."*

- 2.3.9 Paragraph 006, Reference 32-006-20191101 (revision date 01.11.2019), of the PPG identifies what specific air quality issues need to be considered in determining a planning application:

"Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; and significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations; and*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*



- 2.3.10 Paragraph 007, Reference 32-007-20191101 (revision date 01.11.2019), of the PPG provides guidance on how detailed an assessment needs to be:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".

and

"The following could form part of assessments:

A description of baseline conditions and any air quality concerns affecting the area, and how these could change both with and without the proposed development;

- *Sensitive habitats (including designated sites of importance for biodiversity);*
- *The assessment methods to be adopted and any requirements for the verification of modelling air quality;*
- *The basis for assessing impacts and determining the significance of an impact;*
- *Where relevant, the cumulative or in-combination effects arising from several developments;*
- *Construction phase impacts;*
- *Acceptable mitigation measures to reduce or remove adverse effects; and*
- *Measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached."*

- 2.3.11 Paragraph 008, Reference 32-008-20140306 (revision date 01.11.2019), of the PPG provides guidance on how an impact on air quality can be mitigated:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.

Examples of mitigation include:

- *Maintaining adequate separation distances between sources of air pollution and receptors;*
- *Using green infrastructure, trees, where this can create a barrier or maintain separation between sources of pollution and receptors;*
- *Appropriate means of filtration and ventilation;*
- *Including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);*
- *Controlling dust and emissions from construction, operation and demolition; and*
- *Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development."*



Local Planning Policy

Wokingham Borough Council Core Strategy

2.3.12 WBC's Core Strategy (WBC, 2010a) was adopted in January 2010 and sets out the broad spatial vision for the development of the borough up to 2026. The policies relating to air quality have been set out below.

2.3.13 Policy CP1 – Sustainable Development:

“Planning permission will be granted for development proposals that:

- 1. Maintain or enhance the high quality of the environment;*
- 2. Minimise the emission of pollutants into the wider environment;*

[...]

8. Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;

[...]

12. Contribute towards the goal of reaching zero-carbon developments as soon as possible by:

a. including appropriate on-site renewable energy features; and

b. minimising energy and water consumption by measures including the use of appropriate layout and orientation, building form, design and construction, and design to take account of microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form.”

2.3.14 Policy CP6 – Managing Travel Demand:

“Planning permission will be granted for schemes that:

[...]

e. Mitigate any adverse effects upon the local and strategic transport network that arise from the development proposed;

[...]

g. Do not cause highway problems or lead to traffic related environmental problems.”

Wokingham Borough Council Managing Development Delivery Local Plan

2.3.15 The WBC Managing Development Delivery Local Plan (WBC, 2014) was adopted in 2014 and provides extra detail on the policies outlined in the Core Strategy. The policies relating to air quality have been set out below.

2.3.16 Policy TB20: Service Arrangements and Deliveries for Employment and Retail Use:

“Planning permission will only be granted for commercial development proposals throughout the Borough that demonstrate:

a. There is no harmful impact on the amenity of adjoining land uses in terms of noise, fumes and disturbance,



[...]

d. There is no significant adverse environmental impact.”

Wokingham Borough Council Air Quality Action Plan

2.3.17 The Wokingham Borough Council Air Quality Action Plan (WBC, 2018) was adopted in 2018, and outlines the actions the Council will take to improve air quality in the borough between 2017 and 2026. WBC's actions that have been identified in the AQAP fall under the following topics:

- Alternatives to private vehicle use;
- Freight and delivery management;
- Policy guidance and development control;
- Promoting low emission transport;
- Promoting travel alternatives;
- Public information;
- Transport planning and infrastructure; and
- Traffic management.

Wokingham Borough Council Sustainable Design and Construction Supplementary Planning Document

2.3.18 WBC's Sustainable Design and Construction Supplementary Planning Document (WBC, 2010b) outlines the air quality considerations required for new development in the borough in Appendix 3. It highlights existing and emerging planning policies, provides technical guidance relating to the provision of an Air Quality Assessment and offers guidance on site-specific mitigation measures to help achieve the NAQOs.

Wokingham Borough Council Local Plan Update 2023 - 2040

2.3.19 WBC is in the process of producing a new Local Plan which will cover the period 2023 - 2040. The plan includes the following policies related to air quality:

2.3.20 Policy C1: Active and sustainable transport and accessibility states:

“Development proposals must contribute to the delivery of an integrated transport system that is safe and accessible to all by implementing a proportionate package of measures that:

...h) Embrace opportunities to minimise congestion and delay, as part of an effective strategy to manage harmful emissions and improve air quality...”

2.3.21 Policy HC6: Air pollution and air quality states:

1. *“Development proposals should maintain, and where possible improve air quality.*
2. *Development proposals should consider the prevailing air quality and potential impacts upon air quality arising from airborne particulates, dust and odour associated with the construction and operation of a proposal (including vehicular traffic).*
3. *Air Quality Assessments can demonstrate how prevailing air quality and potential impacts upon air quality have been considered and how air quality will be maintained at an*



acceptable standard through avoidance and mitigation measures. Development proposals are likely to require an Air Quality Assessment where:

- a) The site is located within an Air Quality Management Area (AQMA);*
- b) The development has the potential to impact on air quality within an AQMA either on its own or in combination with other development;*
- c) It has the potential to impact on the implementation of Air Quality Action Plans or Local Air Quality Strategies, either on its own or in combination with other development;*
- d) The site is located within or close to an urban area that is known to experience higher levels of airborne particulates from vehicle emissions;*
- e) The site is within proximity to a source of air pollution which could present a significant risk to human health, protected species, or irreplaceable habitats; or*
- f) The type of development would mean its occupiers would be particularly sensitive to air pollution, such as schools, health care establishments or specialist accommodation.*

2.4 Assessment Guidance

- 2.4.1 The primary guidance documents used in undertaking this assessment are detailed in the section below.

DEFRA 'Local Air Quality Management Technical Guidance (LAQM.TG(22))'

- 2.4.2 DEFRA LAQM.TG(22) was published for use by local authorities in their LAQM review and assessment work (DEFRA, 2022). The document provides key guidance on aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

EPUK / IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'

- 2.4.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance to help ensure that air quality is properly accounted for in the development control process (Environmental Protection UK and the Institute of Air Quality Management (EPUK / IAQM), 2017). It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

IAQM 'Guidance on the Assessment of Dust from Demolition and Construction'

- 2.4.4 Guidance on the assessment of dust from demolition and construction has been published by the IAQM (IAQM, 2024). The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.



3 Methodology

3.1 Introduction

- 3.1.1 The assessment methodology detailed in the following sections has been applied to ascertain the potential impacts of emissions to air in order to identify their significance and compliance with policy and regulatory requirements (outlined in **Section 2** of this report), and whether or not additional mitigation is required.
- 3.1.2 This assessment first defines the 'study area', before outlining the baseline air quality (for both 'existing'¹ and relevant future years i.e. development construction, first occupation or completion) within this study area. The impact of construction and operational activities on existing sensitive receptors located within the study area is then assessed, followed by an assessment of the suitability of the Site for the proposed end-use.

3.2 Baseline Air Quality

- 3.2.1 Any exceedances of the limit values along roads within the study area have been identified using the 2020 NO₂ and PM Projections Data published by DEFRA (DEFRA, 2020a). Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by WBC and their LAQM reports to identify potential AQMAs. Background concentrations for the study area have been defined using the national pollution maps published by DEFRA (DEFRA, 2024b) which cover the whole country on a 1x1 km grid.

3.3 Construction Dust Impacts

- 3.3.1 During demolition and construction, dust from on-site activities and off-site trackout by construction vehicles has the potential to impact on sensitive human receptors within the study area. The main potential impacts are loss of amenity (as a result of dust soiling), deterioration of human health (as a result of increased concentrations of PM₁₀) and harm to ecological receptors.
- 3.3.2 The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source(s).
- 3.3.3 Separation distance is also an important factor. Large dust particles (greater than 30 µm), which can be potentially responsible for most dust annoyance, will largely deposit within 100 m of sources. Intermediate particles (10-30 µm) can travel 200-500 m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10 µm), which are the predominant fraction that can be potentially responsible for human health impacts largely remain airborne. However, the impact on the short-term concentrations of PM₁₀ occurs over a shorter distance due to the rapid decrease in concentrations with distance from the source due to dispersion.
- 3.3.4 The assessment of the risk of potential construction dust impacts has been undertaken with reference to relevant guidance (IAQM, 2024).

Screening Assessment

- 3.3.5 The first stage of the assessment involves screening to determine if there are sensitive receptors within threshold distances of the activities associated with the construction phase of

¹ 2023 has been used as the 'existing' year as this is the latest year for which representative local monitoring data is available.



the scheme; defined as the study area. No further assessment is required if there are no receptors within the study area.

3.3.6 The IAQM guidance outlines that an assessment is only required in cases where:

- A 'human receptor' is located within:
 - 250 m of the boundary of the Site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the Site entrance(s).
- An 'ecological receptor' is located within:
 - 50 m of the boundary of the Site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the Site entrance(s).

Further Assessment

3.3.7 The risk of impacts associated with dust soiling and PM₁₀ caused by the Proposed Development has been determined (following the IAQM guidance) based on the dust emission class (or magnitude) for each activity arising from four activities in the absence of mitigation (demolition, earthworks, construction and trackout), the sensitivity of nearby receptors and the overall sensitivity of the area. The dust emission class, receptor sensitivity and the overall sensitivity of the area are determined using the criteria outlined in **Table B-1, Table B-2, Table B-3, Table B-4 and Table B-5 of Appendix B** (based on the IAQM guidance), indicative thresholds and professional judgement. The risk of dust impacts arising is a product of the relationship between the dust emission magnitude and the area sensitivity and is based on the criteria outlined in **Table B-6** (based on the IAQM guidance). The risk of impact is then used to determine the mitigation requirements.

3.3.8 The IAQM guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

3.3.9 With appropriate mitigation in place, the IAQM guidance indicates that the residual effect dust emissions associated with the demolition and construction can be classified as being 'not significant'.

3.4 Demolition and Construction Road Traffic Emission Impacts

3.4.1 The potential for a significant overall effect on existing sensitive receptors within the study area as a result of emissions from demolition and construction traffic generated by the Proposed Development has been determined qualitatively, taking into consideration the screening criteria outlined in the EPUK / IAQM guidance (EPUK / IAQM, 2017) (see **Appendix C**) the anticipated routing of the generated traffic and the anticipated duration of impacts associated with the generated traffic.

3.5 Demolition and Construction Non-Road Mobile Machinery Emission Impacts

3.5.1 The impacts of emissions associated with Non-Road Mobile Machinery (NRMM) during the construction phase of Proposed Development has been undertaken qualitatively, taking into account the following:

- Duration of works;



- Type and number of NRMM to be used on-site;
 - Operating hours of NRMM;
 - Emissions standard to which NRMM comply;
 - Proximity of receptors to NRMM working areas; and
 - Existing background pollutant concentrations.
- 3.5.2 In accordance with DEFRA's LAQM TG.22 (DEFRA, 2022), with suitable controls and site management in place, emissions associated with NRMM and site traffic are unlikely to have significant impact on local air quality.

3.6 Operational Road Traffic Emission Impacts

Screening Assessment

- 3.6.1 The potential for significant impacts on existing sensitive receptors within the study area as a result of emissions from traffic generated by the Proposed Development is determined based on the screening criteria outlined in the EPUK / IAQM guidance (see **Appendix C**) which includes consideration of the volume and composition of traffic generated by the Proposed Development and existing local air quality conditions (i.e. the presence of any declared AQMAs).
- 3.6.2 In relation to proposed sensitive receptors within the Site, a qualitative assessment is initially undertaken to identify the potential for exceedances of the relevant NAQOs at sensitive locations within the Proposed Development. This takes into account future baseline air quality conditions within and in close proximity to the Site, and the proximity of sensitive locations within the Proposed Development to nearby sources of emissions to air.
- 3.6.3 If it is not possible to screen out the potential for significant impacts, then a detailed assessment will be undertaken (see **Paragraphs 3.6.4 to 3.6.13**).

Detailed Assessment

- 3.6.4 Concentrations of pollutants (NO₂, PM₁₀ and PM_{2.5}) will be predicted for a range of worst-case locations of relevant human receptor exposure both at sensitive existing properties and within the Proposed Development itself to allow comparison with the NAQOs and (for existing receptors only) determination of the significance of impacts at each receptor.
- 3.6.5 Emissions from road vehicles and their resultant impact at receptor locations will be predicted using the ADMS-Roads dispersion model (v5.0.1.3). The model requires the user to provide various input data, including traffic flows (in Annual Average Daily Traffic, AADT, format), vehicle composition (i.e. the proportion of Heavy Duty Vehicles (HDVs)), road characteristics (including road width, gradient and street canyon dimensions, where applicable), and average vehicle speed. AADT flows and the proportions of HDVs, for roads within the study area will be provided by the Project's transport consultants, Icen Projects.
- 3.6.6 The following traffic scenarios have been assessed:
- 2023 Baseline;
 - 2032 'Reference Case' (without Proposed Development in place);
 - 2032 'Reference Case' (with Proposed Development in place);
 - 2032 'Option 1' (without Proposed Development in place);
 - 2032 'Option 1' (with Proposed Development in place).



- 3.6.7 The Reference Case scenarios model the existing road layout, whereas the Option 1 scenarios include a number of planned road improvements in the local area. This impacts the routing of traffic and therefore provides different levels of traffic on roads within the study area, as such, both scenarios have been modelled both with and without the Proposed Development. Furthermore, it has been assumed that the Proposed Development will operate as B2 use, which gives a higher trip generation resulting from the Proposed Development compared to a more realistic operational scenario.
- 3.6.8 Detail on roads modelled and receptor locations is provided in **Figure 01** and **Figure 02**, **Appendix F**.
- 3.6.9 The model also requires meteorological data, and 2023 meteorological data from the Farnborough meteorological station have been applied, which are considered suitable for this area due to proximity and similar elevation to the modelled area. Further information on model inputs is provided in **Appendix D**.
- 3.6.10 Traffic emissions will be calculated using the Emission Factor Toolkit (EFT) v13.1 (DEFRA, 2025), which utilises NO_x emission factors taken from the European Environment Agency (EEA) COPERT 5.8 emission tool. The traffic data will be entered into the EFT to provide emission rates for each of the road links entered into the model. Road vehicular emissions are primarily associated with the exhaust emissions but also include particles generated from abrasion (of tyres, brakes and road). The EFT allows users to calculate road vehicle pollutant emission rates for NO_x, PM₁₀ and PM_{2.5} (exhaust and brake, tyre and road wear) for a specified year, road type, vehicle speed and vehicle fleet composition.
- 3.6.11 The EFT provides pollutant emission rates for 2021 through to 2050 and takes into consideration bespoke vehicle fleet information as well as the following information available from the National Atmospheric Emissions Inventory (NAEI) (National Atmospheric Emissions Inventory (NAEI), 2022) and as provided by Transport for London (TfL) bespoke for London:
- fleet composition data for motorways, urban and rural roads in the UK;
 - euro composition based on European emission standards from pre-Euro I to Euro6/VI (including Euro 6 subcategories);
 - vehicle size distributions;
 - scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting;
 - technology conversions in the national fleet; and
 - primary NO₂ (f-NO₂) emission factors for road transport.
- 3.6.12 Road vehicle exhaust emissions of NO_x are projected to decrease year-on-year due to technological advances and improvements to the fleet mix i.e. penetration of Euro VI HDVs,. Whilst there has been uncertainty over NO_x emissions from vehicle exhausts (particularly from Euro 5 and 6 LDVs) it is important to note the EFT is not based on the Euro emission standards.
- 3.6.13 Generally, concentrations of air pollutants in the UK are anticipated to decrease in the coming years. As such, in most cases, the earlier the year that is assessed, the more worst-case the assessment is. In order to take account of uncertainties relating to future year vehicle emissions and background pollutant concentrations to provide a conservative assessment, the assessment will be carried out utilising emission factors and background concentrations from the earliest year the Proposed Development could be operational, combined with traffic data which includes the full build out of the Proposed Development. This is considered a conservative assumption of emissions in the future.



3.7 Consideration of PM_{2.5}

- 3.7.1 A qualitative assessment has also been undertaken in accordance with the PM_{2.5} Target: Interim Planning Guidance (DEFRA, 2024a). The qualitative assessment outlines how exposure to PM_{2.5} has been considered when selecting the Site (i.e. site suitability) as well as what actions and/or mitigations have been considered to reduce PM_{2.5} exposure for development users and nearby receptors (houses, hospitals, schools, etc.) and to reduce emissions of PM_{2.5}/its precursors. The modelled background concentrations published by DEFRA (DEFRA, 2024b) have also been taken into account when considering the likelihood of the PM_{2.5} targets being met within the Proposed Development.

3.8 Assumptions and Limitations

- 3.8.1 There are many components that contribute to the uncertainty in predicted concentrations. The model used in this assessment is dependent upon the traffic that will be input which will have inherent uncertainties associated with them. There is then additional uncertainty as the model is required to simplify real-world conditions into a series of algorithms.
- 3.8.2 There has been an acknowledged disparity between national road transport emissions projections and measured annual mean concentrations of nitrogen oxides (NO_x) and NO₂ for many years. Recent monitoring has shown that reductions in concentrations are now being measured in many parts of the country (Air Quality Consultants Ltd., 2022), however, there is still some uncertainty regarding the rate at which emissions will reduce in the future and therefore some consideration must be given to the accuracy of any projection and to appropriately respond to this.
- 3.8.3 The complete development modelling has been based on emission factors and background concentrations from the earliest possible opening year of the Proposed Development, considered to be 2027, whilst utilising traffic flows from 2032 which are representative of the full build out of the Proposed Development. The model has been verified against 2023 monitoring data. This is considered to provide an appropriately conservative assessment taking into account the uncertainties regarding future vehicle emission factors.

3.9 Air Quality Impacts Significance Criteria

- 3.9.1 The relevant NAQOs are set out in **Table 2-1** and **Table 2-2**. The predicted pollutant concentrations in the opening year at each identified sensitive receptor have been compared to the relevant NAQOs and any exceedances identified.
- 3.9.2 Analysis of long-term monitoring data suggests that if the annual mean NO₂ concentration is less than 60 µg/m³ then the 1-hour mean NO₂ NAQO is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the one-hour mean objective is likely to be achieved (DEFRA, 2022). Analysis of long-term monitoring data also suggests that if the annual mean PM₁₀ concentration is less than 32 µg/m³ then the 24-hour mean PM₁₀ NAQO is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the 24-hour mean NAQO is likely to be achieved.
- 3.9.3 There is no official guidance in the UK on how to assess the significance of the air quality impacts of a new development on existing receptors. The approach developed by EPUK and the IAQM (EPUK / IAQM, 2017), which considers the change in air quality as a result of a Proposed Development on existing receptors in combination with baseline concentrations at the receptors, has therefore been used. The guidance sets out three stages: determining the magnitude of change at each receptor, describing the impact, and assessing the overall significance. Impact magnitude relates to the change in pollutant concentration; the impact description relates this change to the air quality objective and is shown in **Table 3-1**.

Table 3-1 Impact Significance Criteria



Long term average concentration at receptor in assessment year	% Changes in concentration with development in relation to NAQO / limit value			
	1	2-5	6-10	>10
> 110 % ^a	Moderate	Substantial	Substantial	Substantial
>102% - ≤110% ^b	Moderate	Moderate	Substantial	Substantial
>95% - ≤102% ^c	Slight	Moderate	Moderate	Substantial
>75% - ≤95% ^d	Negligible	Slight	Moderate	Moderate
≤75% ^e	Negligible	Negligible	Slight	Moderate

Where concentrations increase the impact is described as adverse, and where it decreases as beneficial.

% change rounded to nearest whole number. Where the % change is 0 (i.e. less than 0.5%) the impact will be 'negligible'.

^a NO₂ or PM₁₀: > 44 µg/m³ annual mean; PM_{2.5}>22 µg/m³ annual mean; PM₁₀>35.2 µg/m³ annual mean (days).

^b NO₂ or PM₁₀: > 40.8 – ≤ 44 µg/m³ annual mean; PM_{2.5}> 20.4 – ≤22 µg/m³ annual mean; PM₁₀>32.64 – ≤35.2 µg/m³ annual mean (days).

^c NO₂ or PM₁₀: > 38 – ≤40.8 µg/m³ annual mean; PM_{2.5}>19 – ≤20.4µg/m³ of annual mean; PM₁₀>30.4 – ≤32.64 µg/m³ annual mean (days).

^d NO₂ or PM₁₀: >30 - ≤38 µg/m³ annual mean; PM_{2.5}>15 - ≤19 µg/m³ annual mean; or <24 - ≤ 30.4 µg/m³ annual mean (days).

^e NO₂ or PM₁₀: ≤30 µg/m³ annual mean; PM_{2.5}≤15 µg/m³ annual mean; PM₁₀ ≤24 µg/m³ annual mean (days).

3.9.4 The guidance states that the overall assessment of significance should be based on professional judgement, taking into account factors including:

- the number of properties affected by 'slight', 'moderate' or 'substantial' adverse air quality impacts and a judgement on the overall balance;
- the magnitude of the changes and the descriptions of the impacts at the receptors;
- whether or not an exceedance of an NAQO or limit value is predicted to arise in the operational study area (where there are significant changes in traffic) where none existed before or an exceedance area is substantially increased;
- the uncertainty, comprising the extent to which worst-case assumptions have been made; and
- the extent to which an NAQO or limit value is exceeded.

3.9.5 Therefore, where impacts at an individual receptor are classified as 'negligible' or 'slight', effects would typically be considered 'not significant'. However, where 'moderate' or 'substantial' adverse impacts are identified at individual receptors, the overall effect needs to be considered in the round taking into account the changes at all of the modelled receptor locations, with a judgement made as to whether the overall air quality effect of the development is 'significant' or not.



4 Baseline Environment

4.1 Site Context

- 4.1.1 The Site currently contains commercial buildings, which formerly served as office space. Directly south of the Site is the B3270, with the M4 motorway main carriageway further to the south. To the north east of the Site there is a residential development, as well as further north and west of the Site. The immediate area north and west of the Site is occupied by woodland and open space, and there are a number of ponds both within and around this woodland. The Site is between Reading and Shinfield, and the local area is largely residential, with a number of open green spaces in proximity to the M4. The location of the Site is shown in **Figure 03, Appendix F**.

4.2 Study Area

- 4.2.1 For the construction dust risk assessment, the study area (based on IAQM, 2024 guidance) is defined as comprising the area up to 250 m from the site boundary and 50 m from the route used by construction vehicles (up to 250 m from the site entrance(s)).
- 4.2.2 For the construction and operational phase road traffic emission assessments, the study area (based on EPUK / IAQM, 2017 guidance) includes the Site, all roads within the WBC traffic model (and adjacent properties) within 250 m of the site boundary and any other roads within the WBC traffic model (and adjacent properties) predicted to exceed the screening criteria outlined in **Appendix C**.

4.3 Sensitive Receptor Locations

- 4.3.1 Relevant sensitive human receptor locations are places where members of the public might be expected to be regularly present over the averaging period of the NAQOs. The NO₂, PM₁₀ and PM_{2.5} annual mean, 1-hour mean NO₂ NAQO and 24-hour mean PM₁₀ sensitive locations include existing residences within the study area. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, traffic lights and roundabouts where traffic may become congested, where there is a combined effect of several road links and routes along which substantial volumes of traffic generated by the Proposed Development will travel.
- 4.3.2 Based on this criteria, seven existing residential properties within the study area have been selected as worst-case receptors for inclusion in the assessment. The locations of these receptors have been chosen to represent locations where impacts from road traffic generated by the Proposed Development are likely to be the greatest i.e. as a result of development traffic at junctions. Receptor locations are described in **Appendix D** and shown in **Figure 01, Appendix F**.
- 4.3.3 Concentrations have also been predicted at three diffusion tube monitoring sites located along Whitley Wood Road and Shinfield Road in order to verify the modelled results. Details of the model verification process are outlined in **Appendix E**.

4.4 Ambient Air Quality

Limit Values

- 4.4.1 The study area is not within a zone where DEFRA have reported an exceedance of a limit value either in the 'existing' baseline year or in any future years.



LAQM

- 4.4.2 WBC and neighbouring RBC have investigated air quality within their area as part of their responsibilities under the LAQM regime. To date, one AQMA has been declared by WBC, and one by RBC as a result of exceedances of the annual mean NO₂ NAQO. The Site is not located within an AQMA, with the closest AQMA to the Site being the Reading AQMA located approximately 520 m west of the Site adjacent to the M4.
- 4.4.3 The boundary of the WBC M4 AQMA previously fell within 50 m of the Site, but this was put forward for revocation in 2023 due to continued compliance with the NAQOs (WBC, 2023), and was officially revoked in 2025.

Local Monitoring Data

NO₂

- 4.4.4 WBC carries out monitoring at two automatic monitoring stations, the nearest of which, CM2 Peach Street, is located 8.5 km from the Proposed Development and therefore is not considered representative of the Site. The Council also deploys NO₂ diffusion tubes at a number of locations, including three locations in close proximity to the Site. Neighbouring Reading Borough Council (RBC) also undertakes monitoring at three locations nearby to the Site. 2019-2023 monitoring results for those monitoring locations are shown in **Table 4-1**, and their locations are shown in **Figure 04, Appendix F**. Whilst 2020 and 2021 monitoring results have been included below, it should be noted that these are not considered to be representative of longer term trends due to the impacts of COVID-19 restrictions on travel behaviours throughout these years.

Table 4-1 Measured Annual Mean NO₂ Concentrations 2019 – 2023

Site ID	Site Type	Within AQMA	Annual Mean (µg/m³)				
			2019	2020	2021	2022	2023
Wokingham Borough Council							
WOK836	Roadside	No	27.0	19.3	18.7	21.5	18.9
WOK841*	Roadside	No	33.3	20.7	23.0	24.4	20.6
WOK882*	Roadside	No	32.6	20.7	23.8	24.9	23.9
Reading Borough Council							
RD025 ^a	Kerbside	Yes	-	-	-	-	15.5
RD056	Kerbside	Yes	34.1	23.8	30.7	28.7	26.9
RD057*	Roadside	Yes	26.2	20.1	24.3	22.2	20.9
NAQO			40				

2019 – 2023 data taken from the WBC 2024 Air Quality Annual Status Report (WBC, 2024) and RBC 2024 Air Quality Annual Status Report (RBC, 2024).

* Used for model verification

^a Low data capture (<75%)

- 4.4.5 Measured concentrations at the closest monitoring location to the Site, WOK841, have been below the annual mean NO₂ NAQO in each of the previous five years. Measured concentrations at all other locations close to the Site have also been below the NAQO across the previous five years. Furthermore, measured concentrations at all diffusion tube monitoring sites are below 60 µg/m³, indicating that it is unlikely that any exceedances of the 1-hour mean objective have occurred. There is a generally decreasing trend in concentrations over time, which is in accordance with national trends (Air Quality Consultants Ltd., 2022).

PM₁₀ and PM_{2.5}

- 4.4.6 WBC does not undertake PM₁₀ or PM_{2.5} monitoring within the study area.



4.5 Predicted Background Concentrations

- 4.5.1 Estimated background concentrations for the Site have been obtained from the latest 2021-based national maps provided by DEFRA (DEFRA, 2024b). The DEFRA background concentrations for the Site in both the 'existing' year (2023), and the opening year (2027), are provided in **Table 4-2**.
- 4.5.2 The background concentrations are all well below the relevant NAQOs both in the 'existing' and future years. Furthermore, background PM_{2.5} concentrations are below the 2040 annual mean concentration target (AMCT) of 10 µg/m³ for PM_{2.5} in all years.

Table 4-2 Estimated Annual Mean Background Concentrations

Year	Location	Annual Mean (µg/m ³)			Represents
		NO ₂	PM ₁₀	PM _{2.5}	
2023	471_168	12.2	14.7	7.7	R07
	472_168*	9.3	14.9	7.9	R02 – R06, WOK882
	472_169	10.2	12.9	8.0	R01
	473_168*	9.5	13.6	7.7	WOK841
	473_170	10.3	12.8	8.1	RD057
2027	471_168	10.1	14.3	7.4	R07
	472_168*	8.1	14.5	7.5	R02 – R06, WOK882
	472_169	8.9	12.5	7.7	R01
	473_168*	8.2	13.2	7.4	WOK841
	473_170	9.0	12.4	7.8	RD057
NAQO / Limit Value		40	40	20	-

* As the M4 Motorway has been modelled in these grid squares, the 'motorway in' sector has been removed to avoid double-counting. (DEFRA, 2024c).

4.6 Predicted Baseline Concentrations

- 4.6.1 The ADMS-Roads model has been used to predict baseline NO₂, PM₁₀ and PM_{2.5} concentrations at each of the receptor locations identified in **Appendix D**. The results for the baseline scenarios are presented in **Table 4-3**.

Table 4-3 Predicted Baseline Concentrations of NO₂, PM₁₀ and PM_{2.5} in 2023 and 2027 (Reference Case and Option 1 Scenarios)

Receptor	Annual Mean (µg/m ³)								
	NO ₂			PM ₁₀			PM _{2.5}		
	2023	2027 Ref	2027 Option 1	2023	2027 Ref	2027 Option 1	2023	2027 Ref	2027 Option 1
R01	14.6	12.1	12.1	13.7	13.3	13.3	8.5	8.1	8.1
R02	26.2	20.6	20.6	18.2	17.8	17.8	9.8	9.4	9.4
R03	30.2	23.8	23.8	18.2	17.8	17.8	10.0	9.5	9.5
R04	35.0	27.5	27.5	20.5	20.1	20.1	11.2	10.7	10.7
R05	28.6	22.4	22.4	18.9	18.5	18.5	10.2	9.8	9.8
R06	20.1	16.0	16.0	16.8	16.4	16.4	9.0	8.6	8.6
R07	20.6	16.2	16.2	16.3	16.0	16.0	8.7	8.4	8.4
NAQOs	40			40			20		

Exceedances of the NAQOs are highlighted in bold.

- 4.6.2 The annual mean NO₂, PM₁₀ and PM_{2.5} NAQOs are not predicted to be exceeded at any of the existing receptor locations in 2023 and 2027 in either the Reference Case or Option 1 without development scenarios. Furthermore, predicted concentrations of NO₂ are lower than 60 µg/m³ during 2023 and 2027, indicating that exceedances of the 1-hour mean NAQO are unlikely, and predicted concentrations of PM₁₀ are lower than 32 µg/m³ during these years, indicating that exceedances of the 24-hour mean NAQO are also unlikely.

5 Predicted Impacts

5.1 Construction Dust Impacts

Screening Assessment

- 5.1.1 There are a number of existing sensitive human receptors (including residential properties) located within 250 m of the site boundary and within 50 m of the routes that will be used by demolition and construction vehicles. As such, further assessment of the risk of dust soiling and PM₁₀ emissions is required.
- 5.1.2 There are sensitive ecological receptors located within 20 m of the site boundary and within 20 m of roads within the Site along which material could be tracked. The Site is bound to the north by Nores Hill Ancient Woodland and Shinfield Park Local Wildlife Site, and to the south and west by Shinfield Park Local Wildlife Site. As such, further assessment of the risk to ecological sites is required.

Further Assessment

Dust Emission Magnitude

- 5.1.3 The dust emissions magnitude of demolition, earthworks and construction activities and as a result of trackout have been determined in **Table 5-1** below based the criteria shown in **Table B-1, Appendix B**.

Table 5-1 Dust Emissions Magnitudes

Activity	Magnitude	Justification
Demolition	Large	The Site currently includes an existing Headquarter Office Building and its associated car park which are both to be demolished. Demolition activities are likely to occur more than 12 m above ground and the total building volume is likely to exceed 75,000 m ³ of material. Therefore, the dust emission magnitude of demolition activities is judged to be 'large'.
Earthworks	Medium	Proposed earthworks activities comprise clearance of vegetation, soil preparation and landscaping across an area between than 18,000 m ² and 110,000 m ² . The soil at the Site is largely classified as slowly draining loamy and clayey soils (Cranfield University, 2024) which are considered to be moderately dusty, particularly during periods of dry weather. Based on this, the dust emission magnitude of earthworks activities is judged to be 'medium'.
Construction	Large	The total building volume to be constructed is expected to be over 75,000 m ³ . Construction materials will comprise a mixture of masonry material including those with a high potential for dust release, such as concrete, as well as those with a lower dust potential such as metals and timber. Based on this, the dust emission magnitude of construction activities is judged to be 'large'.
Trackout	Large	The number of Heavy-Duty Vehicles (HDVs) that will exit the Site will vary depending upon the processes occurring at any one time. There are unlikely to be more than 50 outward HDV movements in any one day. Due to the nature of the Site, there could be an unpaved road length greater than 100 m in length comprising moderately dusty surface material. Based on this, the dust emission magnitude of trackout is judged to be 'large' as a precautionary measure.



Area Sensitivity

- 5.1.4 The area sensitivity to dust soiling and human health impacts has been determined based on the criteria shown in **Table B-3, Table B-4, Table B-5, Appendix B**. The IAQM demolition and construction band criteria used to determine the sensitivity of the local area is shown in **Figure 03, Appendix F**.
- 5.1.5 Residential properties are classed as being 'high sensitivity' receptors to dust soiling, based on the IAQM guidance (IAQM, 2024) (see **Table B-3, Appendix B**). There are between one and ten residential properties located within 20 m of the site boundary, and fewer than 100 residential properties within 50 m. As such, the sensitivity of the area surrounding the Site to dust soiling is judged to be 'medium'.
- 5.1.6 The IAQM guidance indicates that potential impacts of trackout should be considered for sensitive receptors within 50 m of the route used by construction vehicles within a distance of up to 250 m from the site entrance. As the demolition and construction traffic routing is currently unknown, the worst-case assumption has been made that all main roads may potentially be used by HDVs leaving the site entrance(s). There are no residential properties within 50 m of roads extending up to 250 m of the Site; as such, the sensitivity to dust soiling of the area surrounding roads along which material may be tracked is judged to be 'low'.
- 5.1.7 The IAQM also defines residential properties as being 'high sensitivity' receptors to human health impacts (see **Table B-4, Appendix B**). PM₁₀ concentrations at existing residential properties within the study area are anticipated to be similar to the maximum of the modelled 2027 PM₁₀ concentrations in the study area (20.1 µg/m³). Based on the predicted existing PM₁₀ concentrations and the number of sensitive receptors within 20 m of the site boundary and roads along which material may be tracked, the sensitivity to human health impacts of the areas surrounding the Site and the area surrounding roads along which material may be tracked are judged to be 'low'.
- 5.1.8 Ancient Woodland designations with dust sensitive features are classed as being 'medium sensitivity' and Local Wildlife Sites with dust sensitive features are classed as being 'low sensitivity' receptors to dust deposition, based on the IAQM guidance (see **Table B-5, Appendix B**). There is one Ancient Woodland (Nores Hill) located adjacent to the site boundary and a Local Wildlife Site (Shinfield Park) located adjacent to the site boundary, and within 20 m of roads within the Site along which material could be tracked. As such, the sensitivity of the area surrounding the Site to dust deposition, and the sensitivity of the areas surrounding roads along which material may be tracked are judged to be 'medium'.

Risk of Impacts

- 5.1.9 The risk of construction dust impacts, without mitigation, have been defined based on the criteria shown in **Table B-6, Appendix B** and are presented in **Table 5-2**.

Table 5-2 Risk of Construction Dust Impacts without Mitigation

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

5.2 Demolition and Construction Road Traffic Emission Impacts

- 5.2.1 At present, detailed information regarding the construction methodology for the Proposed Development, specific activities and traffic movements is not available. However, a Construction Environmental Management Plan (CEMP) will outline measures to control and minimise the risk of adverse effects from construction activities. The CEMP will be submitted to WBC for their



approval. The CEMP will consider Heavy Goods Vehicles (HGV) and other construction traffic movements, including details of routing and times of day of movements. HGV access will be prevented or minimised, where possible, on traffic sensitive roads, residential streets, congested roads or unsuitable junctions.

- 5.2.2 Vehicle movements associated with access, demolition and construction will vary through the construction programme, with short periods of peak HGV movements associated with demolition and the delivery of materials during the construction phase. However, when the HGV movements are averaged over a full year period (Annual Average Daily Traffic - AADT), these will be significantly lower than peak movements. Together with the implementation of the CEMP, the impacts of emissions associated with construction road traffic on local air quality are considered to be temporary and 'not significant'. Moreover, vehicle movements associated with construction are typically significantly lower than the number of vehicle movements associated with operation of the development, which have been taken into account in this assessment.

5.3 Demolition and Construction Non-Road Mobile Machinery Emission Impacts

- 5.3.1 There are a number of residential properties within 20 m of the Site. Areas where demolition and construction activities will take place are further from these receptors, as there is a woodland buffer around much of the Site. DEFRA-predicted background concentrations of NO₂, PM₁₀ and PM_{2.5} are all well below the relevant NAQOs in 2023 and all future years.
- 5.3.2 In accordance with Part 4 of the IAQM construction dust guidance, all NRMM will need to adhere to the NRMM emissions standards for NO₂ and PM₁₀ outlined in the Road Vehicles and Non-Road Mobile Machinery (Type-Approval) (Amendment and Transitional Provisions) (EU Exit) Regulations 2022 (Statutory Instrument, 2022).
- 5.3.3 Considering the above, the impacts of emissions associated with NRMM during the construction phase of the Proposed Development are considered to be 'not significant'.

5.4 Operational Phase Road Traffic Emission Impacts

Screening Assessment

- 5.4.1 The Proposed Development is expected to generate additional traffic during the operational phase, which will likely result in an increase of over 500 AADT on multiple roads in the local area, and over 100 AADT within the Reading AQMA, thus exceeding the EPUK / IAQM screening criteria (see **Appendix C**). As such, it is not possible to screen out the potential for significant impacts from operational traffic generated by the Proposed Development on existing sensitive properties and a detailed assessment has been undertaken.

Detailed Assessment

- 5.4.2 Predicted concentrations of NO₂, PM₁₀ and PM_{2.5} at existing receptors, both with and without the Proposed Development in place in the Reference and Option 1 scenarios, are presented in **Table 5-3** to **Table 5-8** below. The 'without development' scenarios predicted concentrations include background concentrations and emissions from existing traffic, and the 'with development' scenario predicted concentrations include background concentrations, emissions from existing traffic and traffic generated by the Proposed Development in the relevant transport model scenarios. Traffic data for these scenarios is presented in **Appendix D**.



Reference Scenario

Table 5-3 Predicted Concentrations of NO₂ (µg/m³), % Change and Impact at each Receptor in 2027 – Reference Scenario

Receptor	2027 Without Development	2027 With Development	Change (as % of NAQO)	Impact Descriptor
R01	12.1	12.3	0.7	Negligible
R02	20.6	20.6	0.1	Negligible
R03	23.8	23.8	0.1	Negligible
R04	27.5	27.6	0.2	Negligible
R05	22.4	22.4	0.1	Negligible
R06	16.0	16.0	0.1	Negligible
R07	16.2	16.2	0.1	Negligible
Objectives	40		-	

Table 5-4 Predicted Concentrations of PM₁₀ (µg/m³), % Change and Impact at each Receptor in 2027 – Reference Scenario

Receptor	2027 Without Development	2027 With Development	Change (as % of NAQO)	Impact Descriptor
R01	13.3	13.4	0.3	Negligible
R02	17.8	17.8	0.1	Negligible
R03	17.8	17.9	<0.1	Negligible
R04	20.1	20.1	0.1	Negligible
R05	18.5	18.5	0.1	Negligible
R06	16.4	16.4	<0.1	Negligible
R07	16.0	16.0	<0.1	Negligible
Objectives	40		-	

Table 5-5 Predicted Concentrations of PM_{2.5} (µg/m³), % Change and Impact at each Receptor in 2027 – Reference Scenario

Receptor	2027 Without Development	2027 With Development	Change (as % of NAQO)	Impact Descriptor
R01	8.1	8.2	0.3	Negligible
R02	9.4	9.4	0.1	Negligible
R03	9.5	9.5	<0.1	Negligible
R04	10.7	10.7	0.1	Negligible
R05	9.8	9.8	0.1	Negligible
R06	8.6	8.6	<0.1	Negligible
R07	8.4	8.4	<0.1	Negligible
Objectives	20		-	

- 5.4.3 The predicted NO₂, PM₁₀ and PM_{2.5} concentrations in the 2027 Reference scenario, both without and with the Proposed Development in place, are below the relevant NAQOs at all existing receptors. Furthermore, predicted annual mean NO₂ concentrations are below 60µg/m³ at all receptors, indicating that exceedances of the 1-hour mean NO₂ NAQO are not likely, and the predicted annual mean PM₁₀ concentrations are below 32 µg/m³ at all receptors, indicating that exceedances of the 24-hour mean PM₁₀ NAQO are not likely.
- 5.4.4 The changes in annual mean concentrations for all pollutants range from 0-1% at all receptors; using the criteria set out in **Table 3-1**, these impacts are described as being '**negligible**' at all receptors.



Option 1 Scenario

Table 5-6 Predicted Concentrations of NO₂ (µg/m³), % Change and Impact at each Receptor in 2027 – Option 1 Scenario

Receptor	2027 Without Development	2027 With Development	Change (as % of NAQO)	Impact Descriptor
R01	12.1	12.3	0.7	Negligible
R02	20.6	20.6	0.1	Negligible
R03	23.8	23.8	0.1	Negligible
R04	27.5	27.6	0.2	Negligible
R05	22.4	22.4	0.1	Negligible
R06	16.0	16.0	0.1	Negligible
R07	16.2	16.2	0.1	Negligible
Objectives	40		-	

Table 5-7 Predicted Concentrations of PM₁₀ (µg/m³), % Change and Impact at each Receptor in 2027 – Option 1 Scenario

Receptor	2027 Without Development	2027 With Development	Change (as % of NAQO)	Impact Descriptor
R01	13.3	13.4	0.3	Negligible
R02	17.8	17.8	0.1	Negligible
R03	17.8	17.9	<0.1	Negligible
R04	20.1	20.1	0.1	Negligible
R05	18.5	18.5	0.1	Negligible
R06	16.4	16.4	<0.1	Negligible
R07	16.0	16.0	<0.1	Negligible
Objectives	40		-	

Table 5-8 Predicted Concentrations of PM_{2.5} (µg/m³), % Change and Impact at each Receptor in 2027 – Option 1 Scenario

Receptor	2027 Without Development	2027 With Development	Change (as % of NAQO)	Impact Descriptor
R01	8.1	8.2	0.3	Negligible
R02	9.4	9.4	0.1	Negligible
R03	9.5	9.5	<0.1	Negligible
R04	10.7	10.7	0.1	Negligible
R05	9.8	9.8	0.1	Negligible
R06	8.6	8.6	<0.1	Negligible
R07	8.4	8.4	<0.1	Negligible
Objectives	20		-	

5.4.5 The predicted NO₂, PM₁₀ and PM_{2.5} concentrations in the 2027 Option 1 scenario, both without and with the Proposed Development in place, are below the relevant NAQOs at all existing receptors. Furthermore, predicted annual mean NO₂ concentrations are below 60µg/m³ at all receptors, indicating that exceedances of the 1-hour mean NO₂ NAQO are not likely, and the predicted annual mean PM₁₀ concentrations are below 32 µg/m³ at all receptors, indicating that exceedances of the 24-hour mean PM₁₀ NAQO are not likely.

5.4.6 The changes in annual mean concentrations for all pollutants range from 0-1% at all receptors; using the criteria set out in **Table 3-1**, these impacts are described as being '**negligible**' at all receptors.

5.5 Site Suitability

5.5.1 While nearby monitored concentrations are generally well below the relevant NAQOs, the Site is located nearby to a number of major roads, which will see increases in traffic resulting from



the Proposed Development. Therefore, a qualitative assessment of site suitability has been undertaken.

- 5.5.2 The proposed end-use of the Site is not residential, therefore only the short-term (1-hour NO₂ and 24-hour PM₁₀ NAQOs apply. As all NO₂ concentrations at worst-case receptors within the study area are well below 60 µg/m³, and all PM₁₀ concentrations are well below 32 µg/m³, it is considered that exceedances of these values within the Site are highly unlikely. Therefore, the Site is considered to be suitable for the proposed end-use without the need for further air quality mitigation.

5.6 Consideration of PM_{2.5}

- 5.6.1 In terms of how PM_{2.5} has influenced the selection of the Site, the maximum DEFRA estimated background PM_{2.5} concentration at the Site in the existing year (2023) is 8.1 µg/m³ and in the anticipated opening year (2027) is 7.6 µg/m³.
- 5.6.2 The highest modelled concentrations of PM_{2.5} in the study area are 11.2 µg/m³ in 2023 and 10.7 µg/m³ in 2027 at R04, a residential property on Old Whitley Wood Lane. All other worst-case receptors in the study area predict PM_{2.5} concentrations below the AMCT of 10 µg/m³ in 2023 and 2027. Based on this, PM_{2.5} concentrations at all worst-case receptors within the study area would be expected to fall below the AMCT of 10 µg/m³ by 2040.
- 5.6.3 Given the proposed end use of the Site being commercial, with no centralised combustion-based energy centre, there are considered to be no significant combustion-related sources of PM_{2.5} emissions or its precursors from the Proposed Development.

5.7 Effect Significance

- 5.7.1 The IAQM guidance recommends that no judgement of the significance of effects of construction dust without mitigation is made, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations (IAQM, 2024). Following the implementation of appropriate mitigation measures (as described in **Section 6.1**) the residual effects will be 'not significant'.
- 5.7.2 Overall, taking into account the conservative nature of the assessment, and the criteria set out in **Section 3.9**, the operational air quality effects of the Proposed Development are considered to be 'not significant' on the basis that:
- Emissions associated with the Proposed Development (i.e. from traffic generated by the Proposed Development) will not cause any exceedances of the NAQOs.
 - Impacts as a result of emissions associated with the operation of the Proposed Development will be '**negligible**' at all receptors.



6 Mitigation

6.1 Construction

- 6.1.1 The following standard mitigation measures from the IAQM guidance (IAQM, 2024) and where appropriate will be incorporated into the CEMP for the Site and take into account the outcomes of the construction dust risk assessment (presented in **Table 5-2**).

Table 6-1 Construction Phase Mitigation Measures

Category	Mitigation Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
Management	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real time PM ₁₀ continuous monitoring and/or visual inspections.
	Record all dust and air quality complaints, identify cause(s) and take 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- of off-site, and the action taken to resolve the situation in the log book.
	Hold regular liaison meetings with other high risk construction sites within 250 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 inspections, 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 the 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.
	Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the local authority. Where possible, commence baseline monitoring at least three months before work on a phase commences.
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 productions 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, cover as described below.



Category	Mitigation Measure
	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.
	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.
	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	Avoid bonfires and burning of waste materials.
Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
	Ensure effective water suppression is used during demolition operations. Handheld 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.
	Bag and remove any biological debris or damp down such material before demolition.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
	Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
	Only remove the cover in small areas during work and not all at once.
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.
	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 site access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.



Category	Mitigation Measure
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving the site 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 log book.
	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers 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.
	Access gates to be located at least 10 m from receptors where possible.

- 6.1.2 Furthermore, in accordance with Part 4 of the IAQM demolition and construction guidance, all NRMM will need to adhere to the relevant NRMM emissions standards for NO₂ and PM₁₀. These measures will be implemented through a CEMP secured by a suitably worded planning condition on any permission.

6.2 Operation

- 6.2.1 The operational impacts of the Proposed Development are considered to be 'not significant' and no additional mitigation is therefore required.
- 6.2.2 Nonetheless, operational mitigation measures centred around reducing the number of vehicle trips associated with the Proposed Development will be summarised in the Framework Travel Plan, which is submitted as part of the planning application. These measures include, but are not limited to, the provision of cycle parking spaces in line with local guidance, distribution of travel information packs to users of the Proposed Development, promotion of alternative methods of transport and promotion of local schemes such as car sharing and cycle clubs.

6.3 Mitigation of PM_{2.5} Emissions and Exposure

- 6.3.1 The Travel Plan measures will contribute towards reducing PM_{2.5} emissions associated with the Proposed Development through reducing car trips associated with the Proposed Development and encouraging the use of active and sustainable transport modes.
- 6.3.2 The Site is located approximately 15 m north of the B3270, but is over 100 m from the M4, therefore reducing the risk of exposure of PM_{2.5} from road traffic. Furthermore, there is a landscape buffer proposed within the Site, providing a green infrastructure buffer for buildings on-site, and further reducing exposure of users of the Site to road-traffic related PM_{2.5} emissions. Energy generation at the Site will be based on non-combustion sources to limit combustion-based PM_{2.5} emissions.



7 Summary and Conclusions

- 7.1.1 The air quality impacts associated with a proposed commercial development at Shinfield Park, Reading, located within the boundary of WBC have been assessed.
- 7.1.2 At present, WBC has declared one AQMA due to exceedances of the annual mean NO₂ NAQO. The proposed Site is not located within an AQMA; the closest AQMA to the Site is the Reading AQMA, located approximately 500 m west of the Site around the M4.
- 7.1.3 The construction works have the potential to create dust. During construction it is recommended that, in accordance with the IAQM guidance, a package of mitigation measures is put in place to minimise the risk of elevated PM₁₀ concentrations and dust nuisance in the surrounding area. With mitigation in place the construction impacts are judged as not significant.
- 7.1.4 Concentrations of NO₂, PM₁₀ and PM_{2.5} has been predicted for a number of worst-case locations representing existing properties adjacent to the road network. The significance of any potential impacts to air quality will be determined based on the criteria outlined in the EPUK/IAQM guidance (EPUK/IAQM, 2017) and **Section 3.9** of this report.
- 7.1.5 Mitigation measures to reduce the impacts of the Proposed Development on air quality concentrations are not required, but additional transport related mitigation measures, contained within the Framework Travel Plan for the Proposed Development, will be employed to reduce emissions, and thus mitigate air quality impacts resulting from the Proposed Development.
- 7.1.6 Overall, the Proposed Development is considered to be in accordance with the requirements of the NPPF, and relevant local and national planning policy and guidance regarding air quality.



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Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
AMCT	Annual Mean Concentration Target
AQAP	Air Quality Action Plan
AQR	Air Quality Regulations
AQMA	Air Quality Management Area
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube	A passive sampler used for collecting NO ₂ in the air
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes. Includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NAEI	National Atmospheric Emission Inventory
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO ₂	Nitrogen Dioxide
NO _x	Oxides of nitrogen generally considered to be nitric oxide and NO ₂ . Its main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles
NPPF	National Planning Policy Framework
PM ₁₀ /PM _{2.5}	Small airborne particles less than 10/2.5 µm in diameter
PPG	Planning Practice Guidance
RBC	Reading Borough Council
Receptor	A location where the effects of pollution may occur
WBC	Wokingham Borough Council



Appendix B IAQM Dust Guidance (2024) Approach

Table B-1 Dust Emission Magnitude Classification

Activity	Dust Emission Magnitude		
	Large	Medium	Small
Demolition	Total building volume of >75,000 m ³ , potentially dusty construction material, on-site crushing and screening, demolition activities >12 m above ground	Total building volume of 12,000 – 75,000 m ³ , potentially dusty construction material, demolition activities 6 – 12 m above ground level	Total building volume of <12,000 m ³ , construction material with low potential for dust release, demolition activities <6 m above ground, demolition during wetter months
Earthworks	Total site area of >110,000 m ² , potentially dusty soil type, >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height	Total site area of 18,000 – 110,000 m ² , moderately dusty soil type, 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 3 - 6 m in height	Total site area of <18,000 m ² , soil type with large grain size, <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height
Construction	Total building volume >75,000 m ³ , on-site concrete batching, sandblasting	Total building volume 12,000 - 75,000 m ³ , potentially dusty construction material, on-site concrete batching	Total building volume <12,000 m ³ , construction material with low potential for dust release
Trackout	>50 HDV outwards movements in any one day, potentially dusty surface material, unpaved road length >100 m	20 - 50 HDV outwards movements in any one day, moderately dusty surface material, unpaved road length 50 - 100 m	<20 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

Table B-2 Receptor Sensitivity

Receptor Sensitivity	Impact		
	Dust Soiling	Health Effects of PM ₁₀	Ecological Impacts
High	An area where: - Users can reasonably expect enjoyment of a high level of amenity; - The appearance, aesthetics or value of their property would be diminished by soiling; - The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more per day). Examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Locations with an international or national designation <i>and</i> the designated features may be affected by dust soiling; OR Locations where there is a community of particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain. Indicative examples include a SAC designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.



Medium	An area where: - Users would expect to enjoy of a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; - The appearance, aesthetics or value of their property could be diminished by soiling; - The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods, as part of the normal pattern of use of the land. Examples include parks and places of work.	Locations where people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more per day). Examples include office and shop workers, but will generally not include workers occupationally exposed to for PM₁₀, as protection is covered by Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; OR Locations with a national designation where the features may be affected by dust deposition. Indicative example is a SSSI with dust sensitive features.
Low	An area where: - The enjoyment of amenity would not reasonably be expected; - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks and roads.	Locations where human exposure is transient. Examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Indicative example is a LNR with dust sensitive features.

Table B-3 Sensitivity of an Area to Dust Soiling Effects

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B-4 Sensitivity of an Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32 µg/m ³	>100	High	High	High	Medium
		10 – 100	High	High	Medium	Low



Air Quality Assessment
Shinfield Park, Shinfield

	28 - 32 µg/m ³	1 - 10	High	Medium	Low	Low
		>100	High	High	Medium	Low
		10 – 100	High	Medium	Low	Low
	24 - 28 µg/m ³	1 - 10	High	Medium	Low	Low
		>100	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low
	<24 µg/m ³	1 - 10	Medium	Low	Low	Low
		>100	Medium	Low	Low	Low
		10 – 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	>32 µg/m ³	>10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32 µg/m ³	>10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 - 28 µg/m ³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	<24 µg/m ³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table B-5 Sensitivity of an Area to Ecological Impacts

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

Table B-6 Risk of Dust Impacts Calculation Matrix

Sensitivity of 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 Risk
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk
Trackout	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk



Appendix C EPUK / IAQM Guidance (2017)

Screening Criteria

The Development Will:	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in LDV traffic flows on local roads with relevant receptors.	A change of LDV flow of: • >100 AADT within or adjacent to an AQMA; and • >500 AADT elsewhere.
Cause a significant change in HDV flows on local roads with relevant receptors.	A change of HDV flow of: • >25 AADT within or adjacent to an AQMA; and • >100 AADT elsewhere.
Realign roads i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5 m or more and the road is within an AQMA.
Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle acceleration / deceleration, e.g. traffic lights, or roundabouts.
Introduce or change a bus station.	A change of bus flows of: • >25 AADT within or adjacent to an AQMA; and • >100 AADT elsewhere.
Have an underground car park with extraction system.	The ventilation extract for the car park will be located within 20 m of a relevant receptor; and The car park will have >100 movements per day (total in and out).

The screening criteria presented is amended from Table 6.2 of the EPUK / IAQM guidance (EPUK / IAQM, 2017). Only the screening criteria relevant to changes in transport (including both traffic and the transport network) are outlined.



Appendix D Model Inputs and Results Processing

D.1 Summary of Model Inputs

Meteorological Data	2023 hourly meteorological data from Farnborough station has been used in the model. The wind rose is shown in Figure D-1.
ADMS	Version 5.0.1.3
Time Varying Emission Factors	Based on Department for Transport statistics. Table TRA0307. Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2023
Latitude	51.4°
Minimum Monin-Obukhov length	A value of 30 for 'cities and large towns' was used to represent the modelled area and the meteorological station site.
Surface Roughness	A value of 0.5 for 'parkland, open suburbia' was used to represent the modelled area. A value of 0.3 for 'agricultural areas (max)' was used to represent the meteorological station site.
Emission Factor Toolkit (EFT)	V13.1 (DEFRA, 2025)
NOx to NO ₂ Conversion	NOx to NO ₂ calculator version 9.1, August 2020 (DEFRA, 2024c)
Background Maps	2021 reference year background maps (DEFRA, 2024b)
NOx Sector Removal Tool	DEFRA's NO ₂ Adjustment for NOx Sector Removal Tool v9.0 (DEFRA, 2024d)

D.2 Receptor Locations

Receptor	Description	X Coordinate	Y Coordinate	Height (m) ^a
R01	Residential property on Cirrus Drive	472982.2	169192.4	1.5
R02*	Residential property on Longmore Road	472730.3	168794.3	1.5
R03*	Residential property at Brookers Hill	472733.1	168682.7	1.5
R04*	Residential property on Old Whitley Wood Lane	472537.5	168699.2	1.5
R05*	Residential property on Old Whitley Wood Lane	472311.4	168673.2	1.5
R06*	Residential property on Lexington Grove	472187.2	168705.5	1.5
R07	Residential property on Harness Close	471886.0	168754.1	1.5

* As the M4 Motorway has been modelled in the same background grid square as these receptors, the 'motorway in' sector has been removed to avoid double-counting in concentrations. (DEFRA, 2024c).



D.3 Traffic Data

Link ID	2023 Baseline		2027 without Development (Reference Case)		2027 with Development (Reference Case)		2027 without Development (Option 1)		2027 with Development (Option 1)	2027 with Development (Option 1)
	AADT	HDV (%)	AADT	HDV (%)	AADT	AADT	AADT	HDV (%)	AADT	HDV (%)
1	43662.3	7.5	47360.8	7.5	47353.4	7.5	47515.5	7.7	47486.0	7.7
10208_10212	37812.8	2.3	39906.8	2.3	39936.3	2.2	40827.5	1.9	40783.3	1.9
10242	18906.4	0.9	19953.4	0.9	20108.1	0.9	21927.4	0.8	22177.8	0.9
10244	10168.6	2.8	10731.7	2.8	10783.2	2.8	14996.4	2.4	15047.9	2.4
10245	8228.4	2.1	8684.0	2.1	8743.0	2.1	11586.1	1.6	11726.0	1.8
10255	9264.6	0.4	9781.5	0.4	9833.1	0.5	9759.4	0.4	9833.1	0.5
10256	6941.5	0.4	7328.8	0.4	7365.6	0.5	7188.8	0.4	7225.7	0.5
10274	61711.2	3.3	66938.6	3.3	67122.7	3.3	68249.6	3.6	68153.9	3.6
10276	62892.8	5.9	68220.2	5.9	68227.6	5.9	68080.2	6.2	68043.4	6.2
10285	22958.4	2.4	24903.1	2.4	24969.4	2.4	25809.1	3.0	25728.0	3.0
10287	19230.4	2.2	20859.4	2.2	20874.1	2.2	20564.8	2.7	20557.4	2.7
111	11508.6	0.7	12145.9	0.7	12219.5	0.8	11637.6	0.8	11696.6	0.8
2	38752.9	3.8	42035.5	3.8	42153.3	3.8	42440.6	3.9	42425.9	3.9
200_215	2644.0	2.1	2791.6	2.1	2791.6	2.1	2975.7	2.0	2968.3	2.0
200	1388.3	3.5	1465.8	3.5	1465.8	3.5	1524.7	3.4	1517.3	3.4
215	1255.7	0.6	1325.8	0.6	1325.8	0.6	1451.0	0.5	1451.0	0.5
229	9031.0	0.5	9531.1	0.5	9553.2	0.5	10510.7	0.8	10798.0	0.9
230_229	16491.6	0.5	17404.9	0.5	17449.1	0.5	19069.5	0.8	19356.8	0.8
230	7460.7	0.4	7873.8	0.4	7895.9	0.4	8558.8	0.7	8558.8	0.7
238	20225.5	1.8	21345.5	1.8	21470.7	1.8	25647.0	1.8	25742.8	1.8
253	16303.7	1.5	17213.4	1.5	17493.3	1.5	16882.0	1.2	16963.0	1.2
254	19959.3	2.1	21073.0	2.1	21279.2	2.1	21198.2	1.8	21419.2	1.8
255	20384.9	2.1	21522.3	2.1	21824.3	2.0	21897.9	1.7	22244.1	1.7
257_255	36744.4	1.8	38794.6	1.8	39354.4	1.8	38941.9	1.5	39435.4	1.5
257	16359.5	1.4	17272.3	1.4	17530.1	1.5	17044.0	1.3	17191.3	1.3
259_10238	10227.3	0.9	10798.0	0.9	10856.9	0.9	11144.2	0.7	11136.8	0.7
3	8291.4	2.4	8754.0	2.4	8820.3	2.4	8536.7	2.1	8684.0	2.1
354_10207	30305.2	2.3	31996.2	2.3	32401.3	2.3	31487.9	2.0	32025.6	2.0



354	13722.5	2.1	14488.1	2.1	14760.7	2.1	14414.5	1.8	14657.5	1.9
455	11376.0	0.7	12005.9	0.7	12116.4	0.8	11431.4	0.8	11534.5	0.8
567_568	3831.5	0.0	4043.7	0.0	5001.2	0.4	4522.5	0.0	5472.6	0.4
567	1263.2	0.0	1333.2	0.0	1620.4	0.5	1311.1	0.0	1613.1	0.5
568	2568.3	0.0	2710.5	0.0	3380.8	0.4	3211.4	0.0	3859.6	0.4
R1_AB	32234.5	1.4	34027.2	1.4	34316.0	1.4	36061.5	1.2	36364.9	1.2
R1_BC	30387.8	1.5	32077.9	1.5	32349.2	1.5	33916.2	1.2	34204.9	1.2
R1_CD	29955.5	1.4	31622.9	1.4	31873.2	1.4	32961.2	1.1	33242.1	1.1
R1_DA	31587.4	1.3	33342.1	1.3	33577.9	1.3	36193.6	1.1	36491.2	1.2
R2_AB	1915.8	0.0	2021.9	0.0	2500.6	0.4	2261.2	0.0	2736.3	0.4
R2_BA	1915.8	0.0	2021.9	0.0	2500.6	0.4	2261.2	0.0	2736.3	0.4

D.4 Windrose

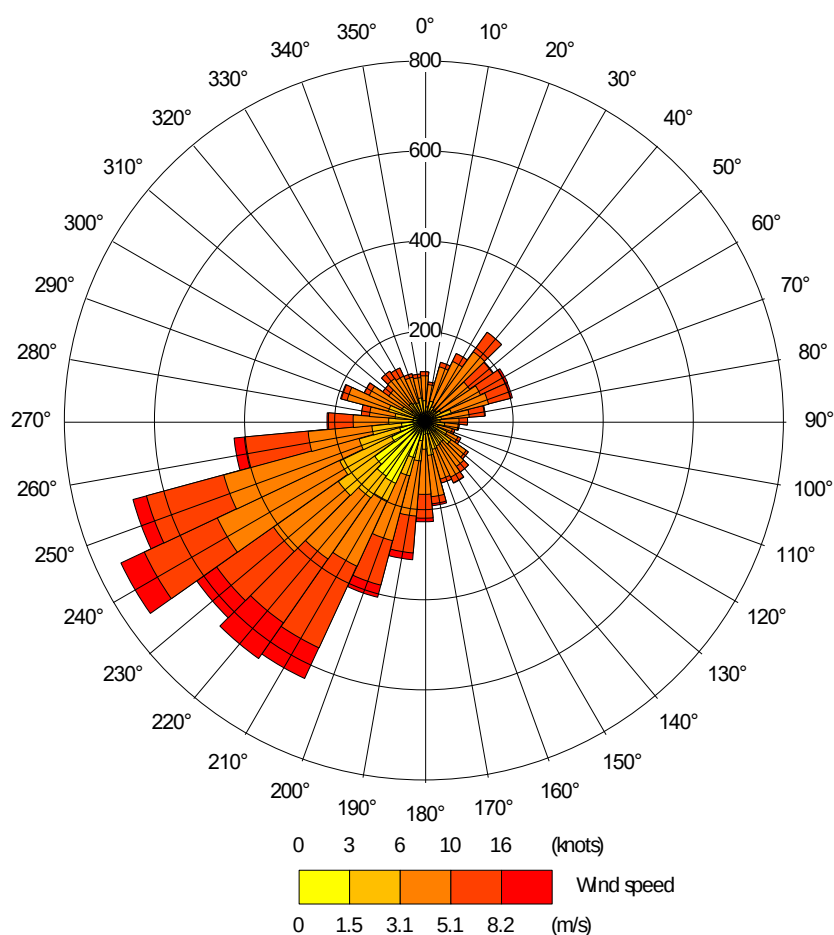


Figure D-1: 2023 windrose for Farnborough



Appendix E Model Verification

NO₂

Most NO₂ is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emission of nitrogen oxides (NO_x = NO + NO₂). The model has been run to predict the 2023 annual mean road-NO_x contribution for four diffusion tube locations (identified in **Table 4-1**) closest to, and most representative of the Proposed Development. Concentrations have been modelled at a height of 2.3 m for RD056, 2.4 m for WOK841 and 2.5 m for WOK882. The diffusion tube monitoring site RD056 on Shinfield Road has not been used as it is not considered suitable for use for model verification.

A primary adjustment factor of **2.4348** has been determined as the slope of the best fit line between the modelled road NO_x contribution and the 'measured' road-NO_x (which is calculated from the measured and background NO₂ concentrations within DEFRA's NO_x from NO₂ calculator (DEFRA, 2024d), forced through zero (**Figure E-1**). This factor has then been applied to the raw modelled road-NO_x concentration to provide adjusted modelled road-NO_x concentrations.

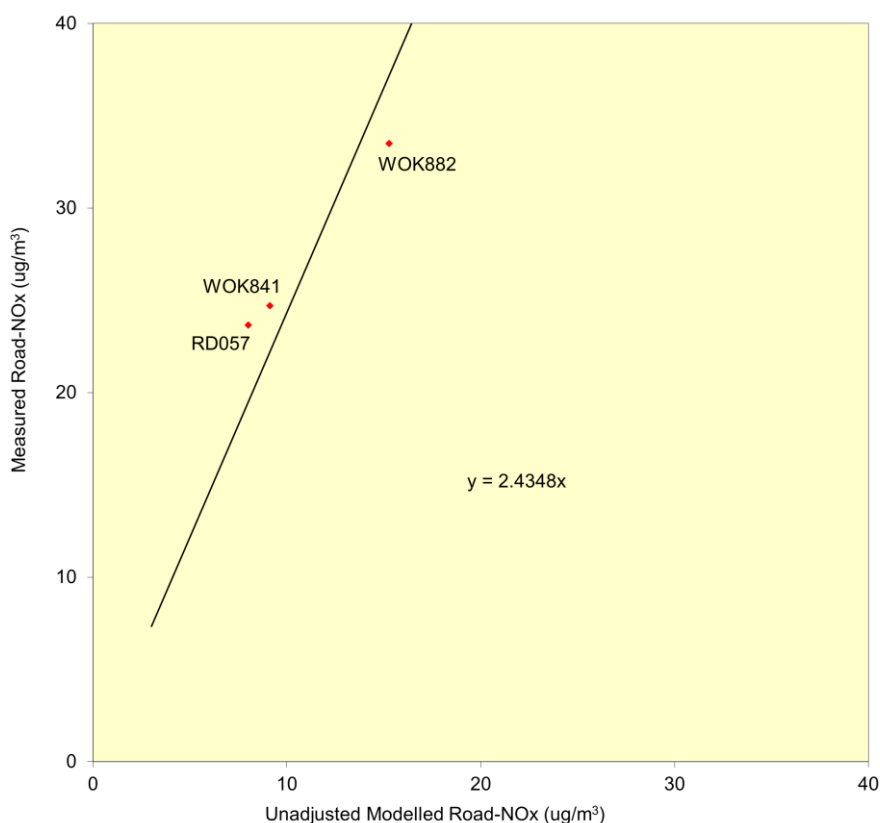


Figure E-1 Measured and Unadjusted Road-NO_x Comparison

The total NO₂ concentrations have then been determined by combining the adjusted modelled road-NO_x concentrations with the background NO₂ concentration within DEFRA's NO_x from NO₂ calculator (DEFRA, 2024d). A secondary adjustment factor of **1.0131** has then been calculated as the slope of the best fit line applied to the adjusted data and forced through zero (**Figure E-2**).



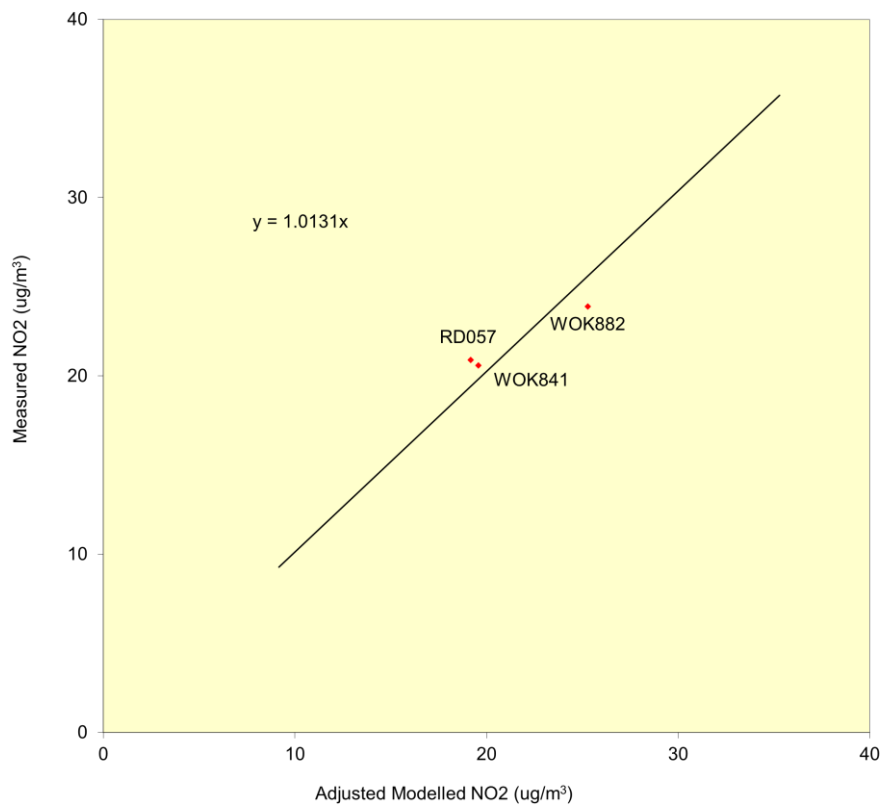


Figure E-2 Measured and Primary Adjusted Modelled NO₂ Comparison

Figure D-3 compares final adjusted modelled total NO₂ at each of the monitoring sites, to measured total NO_x and shows the 1:1 relationship, as well as $\pm 10\%$ and $\pm 25\%$ of the 1:1 line.



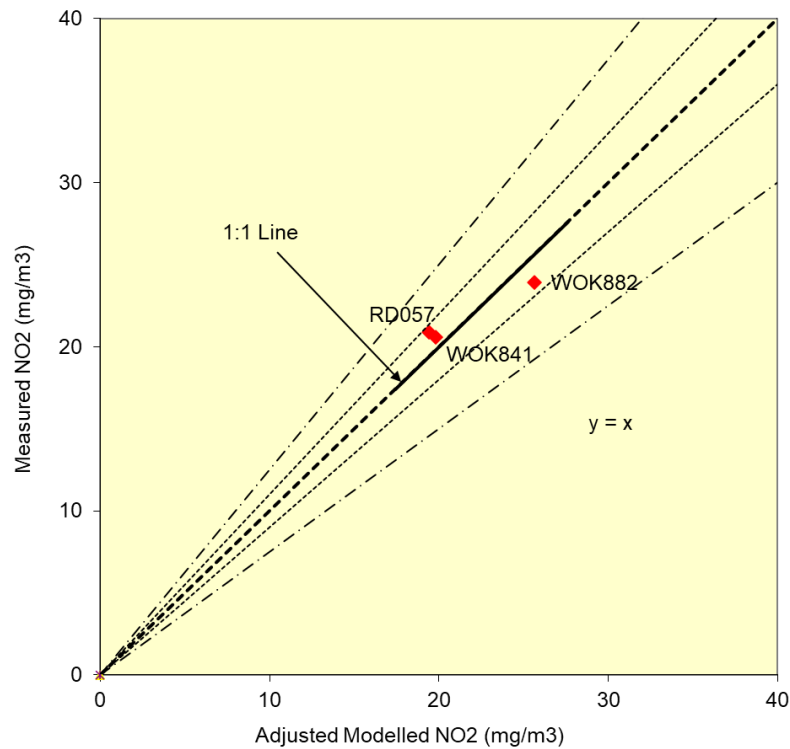


Figure E-3 Measured and Final Adjusted Modelled NO₂ Comparison

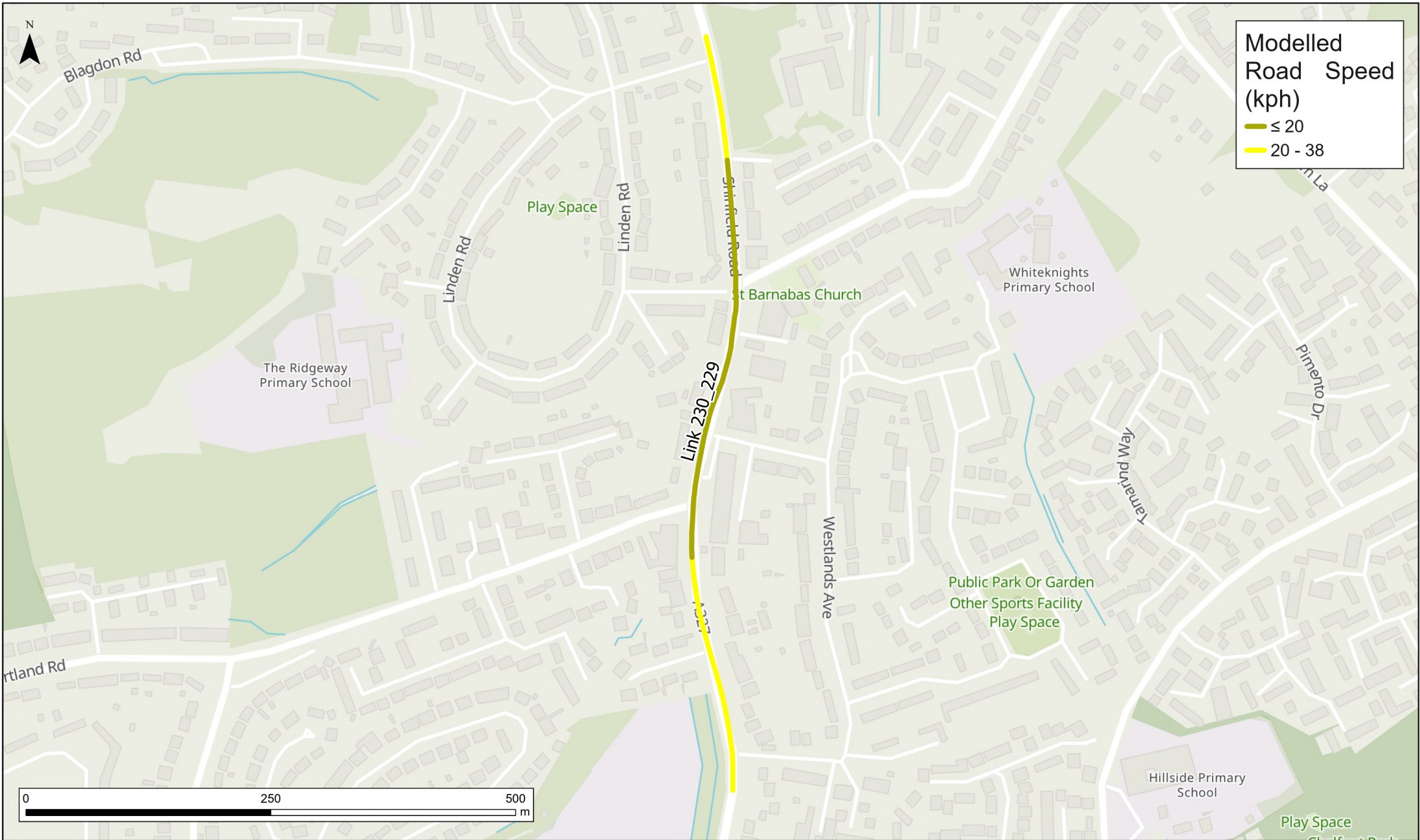
The calculated adjustment factors imply that overall, the model has under-predicted the road-NO_x contribution. This is a common experience with this and most other models. The calculated Root Mean Square Error (RMSE) for this verification (1.4 µg/m³) lies within the range considered to be acceptable by DEFRA (DEFRA, 2022) (0 – 10).

PM₁₀ and PM_{2.5}

As there are no suitable PM₁₀ or PM_{2.5} monitoring sites in the study area, the adjustment factor calculated of NO₂ has been applied to the modelled road-PM₁₀ and road-PM_{2.5} concentrations.

Appendix F Figures





Client



SHINFIELD PARK, SHINFIELD

Modelled Road Network and Receptor Locations

GB Topographic: Contains OS data © Crown Copyright and database right 2025
Contains data from OS Zoomstack

1:5,000 @ A4

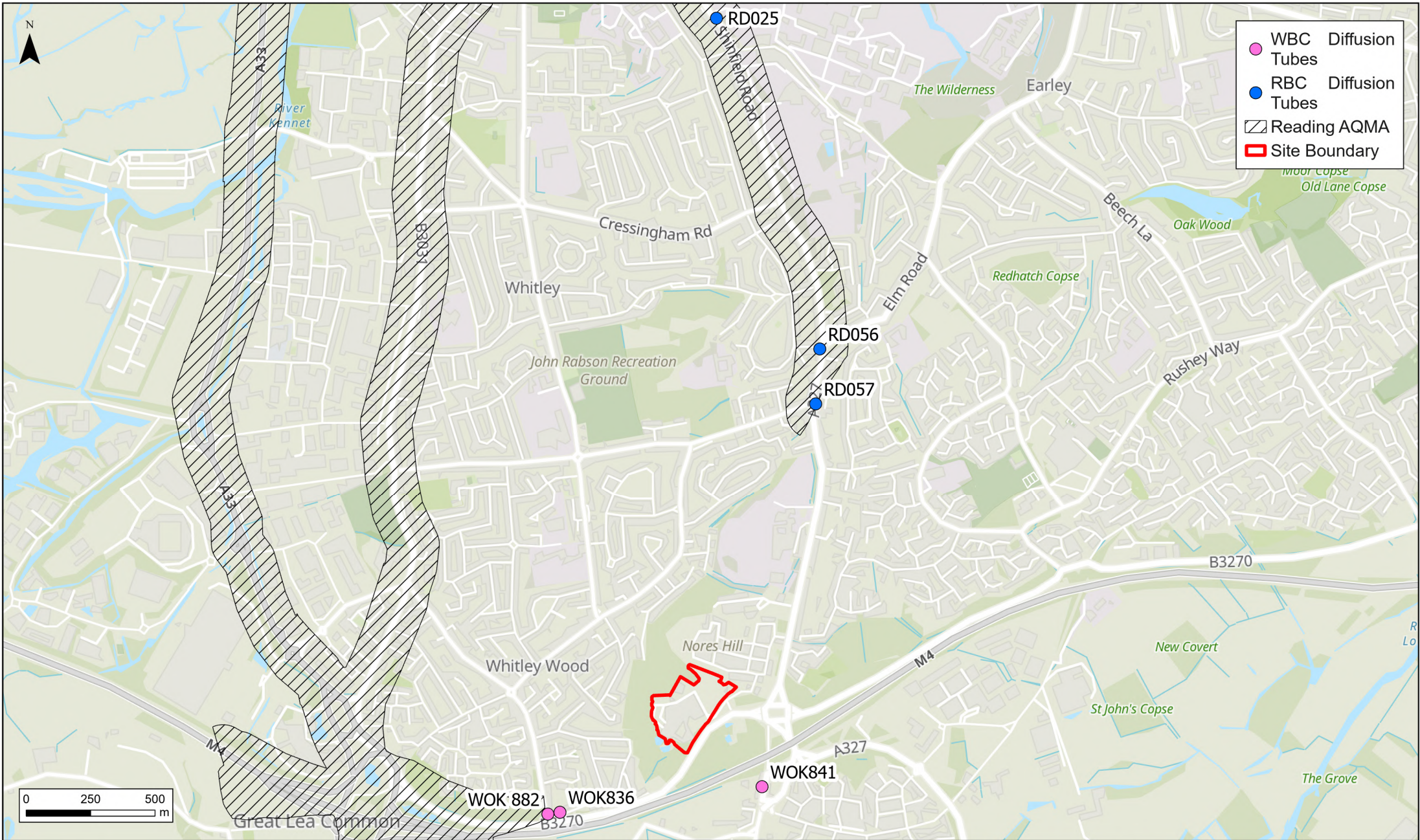
Date: 22/05/2025

Drawn: JD

Checked: PB

Figure 02

Rev A



SHINFIELD PARK, SHINFIELD
Monitoring Locations and AQMAs within
the Study Area

GB Topographic: Contains OS data © Crown Copyright and database
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Contains data from OS Zoomstack

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Figure 03	Rev A

