

Bellway Homes Limited

Boreham Road, Warminster

Air Quality Assessment

REPORT REF.

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Contents

	Page
1 Introduction	6
2 Approach	9
3 Policy, Legislation and Guidance.....	16
4 Baseline Conditions	23
5 Predicted Impacts	29
6 Mitigation	39
7 Conclusions	40
8 Further Work	42

Appendices

Appendix A: Construction Phase Methodology	43
Appendix B: Operation Phase Methodology	50
Appendix C: Construction Dust Mitigation	57

Figures

Figure 1-1: Site Location	7
Figure 4-1: Local Monitoring	24
Figure 8-1: Modelled Windrose – Larkhill (Boscombe Down)	52
Figure 8-2: Modelled Roads	53
Figure 8-3: Comparison of Modelled Road-NO _x with Measured Road NO _x	55
Figure 8-4: Comparison of Modelled and Monitored NO ₂	56

Tables

Table 2-1: EPUK & IAQM Indicative Criteria for Requiring Detailed Assessment	10
Table 2-2: IAQM Impact Descriptors for Individual receptors.....	11
Table 3-1: Air Quality Assessment Levels (AQALs)	19
Table 3-2: Examples of Where the Air Quality Objectives Apply	21
Table 4-1: Local Monitoring – NO ₂	24
Table 4-2: Background Pollution Concentrations	25
Table 4-3: Demolition, Earthworks and Construction Dust Sensitive Receptors	26
Table 4-4: Trackout Dust Sensitive Receptors.....	27

Table 4-5: Additional Area Sensitivity Factors to Potential Dust Impacts	27
Table 4-6: Operation Phase Existing Receptors (Human)	28
Table 4-7: Operation Phase Proposed Receptors (Human)	29
Table 5-1: Sensitivity of the Surrounding Area to Potential Dust Impacts.....	29
Table 5-2: Earthworks Emissions Magnitude	30
Table 5-3: Construction Emissions Magnitude	31
Table 5-4: Trackout Emissions Magnitude	32
Table 5-5: Summary of Potential Unmitigated Dust Risks	32
Table 5-6: Predicted Annual Mean Concentration of NO ₂ Due to Development.....	33
Table 5-7: Predicted Annual Mean Concentration of PM ₁₀ Due to Development.....	34
Table 5-8: Predicted Annual Mean Concentrations of PM _{2.5} Due to Development.....	35
Table 5-9: Predicted Concentration of NO ₂ Within the Development	36
Table 5-10: Predicted Concentration of PM ₁₀ Within the Development	37
Table 5-11: Predicted Concentration of PM _{2.5} Within the Development	37
Table 7-1: Policy Compliance	40
Table 8-1: Construction Dust - Magnitude of Emission.....	44
Table 8-2: Examples of Factors Defining Sensitivity of an Area	45
Table 8-3: Sensitivity of the Area to Dust Soiling	46
Table 8-4: Sensitivity of the Area to Human Health Impacts	46
Table 8-5: Sensitivity of the Area to Ecological Impacts.....	47
Table 8-6: Dust Risk Category from Demolition Activities	48
Table 8-7: Dust Risk Category from Earthworks and Construction Activities	48
Table 8-8: Dust Risk Category from Trackout Activities.....	48
Table 8-9: ADMS-Roads Model Inputs Processing Tools.....	50
Table 8-10: Traffic Data used in ADMS Model	53
Table 8-11: Modelled and Monitored Concentrations	54
Table 8-12: Post-adjusted 2024 Modelled and Monitored Results	55
Table 8-13: Fugitive Dust Emission Mitigation Measures	57

Document Control Sheet

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Statement of Competence

The following authors of this report are Members of the Institute of Air Quality Management (IAQM) and possess the requisite qualifications, expertise, and experience to conduct robust air quality assessments and analyses in accordance with regulatory standards and best practices.

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1 Introduction

Background

- 1.1 Ardent Consulting Engineers (ACE) have been appointed by Bellway Homes Limited to prepare an Air Quality Assessment (AQA) in support of a planning application for a proposed residential development on land north of Boreham Road, Warminster, within Wiltshire Council (WC).
- 1.2 The 'Proposed Development' involves the provision of up to 135 residential dwellings, landscaping and associated infrastructure. The proposals also involve the upgrading of the existing vehicular / pedestrian access to the Site from Boreham Road.

Site Location and Context

- 1.3 'The Site' is situated to the east of Warminster and is bound to the south by Boreham Road. The Site is located on land approximate National Grid Reference (NGR): 389459, 144598.
- 1.4 To the north is an MOD sports facility and agricultural land. Existing residential properties are also located to the west and south, with Home Farm and Bishopstrow Hotel to the east. The Site location is shown below:



Figure 1-1: Site Location

Planning History

- 1.5 The Site was previously subject to an outline planning application for the development of up to 135 dwellings and supporting infrastructure with all matters reserved excluding access (WC planning ref. 16/10502/OUT). This application was formally withdrawn on 29th January 2020, in large part due to concerns over the heritage impact of the proposed development.
- 1.6 The withdrawn application as mentioned above also featured air quality consultation in which it was highlighted that an AQA must be undertaken.

Purpose of Report

- 1.7 The Proposed Development has the potential to cause impacts, including fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the Site during the operation phase. If part of the design, energy plant installed to provide heating and hot water during operation could also affect local air quality.
- 1.8 An AQA has therefore been undertaken to determine baseline conditions and consider potential impacts and effects associated with the Proposed Development during construction and operation against this baseline, in air quality terms, as detailed in the following report.

2 Approach

- 2.1 The approach to preparing an AQA in the UK typically involves the following steps:

Screening and Scoping

- 2.2 Screening identifies if an AQA is needed by evaluating potential emissions and their likely impacts. This involves considering the type and scale of the project and its proximity to sensitive receptors (e.g., residential areas, schools, hospitals).
- 2.3 Scoping then defines the scope of the assessment, including the pollutants to be considered, the geographical area to be covered, and the receptors to be included.
- 2.4 The relevant screening assessment is provided below, followed by the scope of assessment determined to be required to appropriately assess the potential air quality impacts and effects of the Proposed Development.

Screening

Development Classification

- 2.5 WC's Air Quality Supplementary Planning Document (SPD) outlines the criteria for classifying development sites. In accordance with the SPD, the Proposed Development can be classified as being a Type 2 site, as >100 residential dwellings are proposed. However, as shown in Section 4, the Site is not assessed to be located within an area of poor air quality, and therefore the Type 3 criteria are not triggered.

Construction Phase

Fugitive Dust Emissions: Impact

- 2.6 The construction phase of the Proposed Development has the potential for fugitive dust emissions to occur owing to construction phase activities, such as demolition, earthworks, construction and trackout activities.
- 2.7 The potential for impacts at sensitive locations of relevant exposure depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

- 2.8 The desk-study undertaken to inform the baseline (see Section 4) identifies several sensitive receptors within 250m of the red line boundary of the Site. As such, further assessment of potential dust impacts has been undertaken (see Appendix A for the construction phase methodology).

Construction Traffic Emissions: Impact

- 2.9 The Institute of Air Quality Management (IAQM) advise that from experience of assessing exhaust emissions from site traffic, it is unlikely that any significant adverse impacts on local air quality would be caused, and in most cases, quantitative assessment is not needed.

Operation Phase

Road Traffic Emissions: Impact (Human Health)

- 2.10 The Proposed Development has been screened against the following indicative criteria for requiring an AQA as detailed in the EPUK & IAQM 'Land use Planning & Development Control: Planning for Air Quality, V1.2' guidance:

Table 2-1: EPUK & IAQM Indicative Criteria for Requiring Detailed Assessment

Criteria	Evaluation
A change in Light-Duty Vehicle traffic flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA), or more than 500 AADT elsewhere on local roads with relevant receptors.	Yes
A change in Heavy-Duty Vehicle (HDV) flows of more than 25 AADT within or adjacent to an AQMA, or more than 100 AADT elsewhere on local roads with relevant receptors.	No
A change in the alignment of roads by 5m or more and the road is within an AQMA.	No
Introduction of a new junction or remove an existing junction that cause traffic to significantly change vehicle accelerate/decelerate, e.g., traffic lights, or roundabouts, near to relevant receptors.	No
Introduce or change a bus station, where bus flows will change by more than 25 AADT within or adjacent to an AQMA, or more than 100 AADT elsewhere.	No

Criteria	Evaluation
Has an underground car park with an extraction system within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	No
Has one or more substantial combustion processes, including combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping, where there is a risk of impacts at relevant receptors.	No

2.11 ACE, the transport consultants, have confirmed that the Proposed Development will increase two-way AADT movements exceeding the EPUK & IAQM screening criteria above, on Boreham Road adjacent to the Site.

2.12 Therefore, detailed modelling of operational traffic impacts has been carried out using the ADMS-Roads dispersion model. Further details of the modelling data inputs and results processing is provided in Appendix B.

2.13 The magnitude of impacts has been determined using the criteria set out within the EPUK & IAQM air quality planning guidance, as set out in Table 2-2.

Table 2-2: IAQM Impact Descriptors for Individual receptors

Annual Mean Concentration	% Change ^a			
	1 ^b	2-5	6-10	>10
≤ 75%	Negligible	Negligible	Slight	Moderate
≤ 76% - ≤ 95%	Negligible	Slight	Moderate	Moderate
≤ 96% - ≤ 102%	Slight	Moderate	Moderate	Substantial
≤ 103% - ≤ 110%	Moderate	Moderate	Substantial	Substantial
≥ 110%	Moderate	Substantial	Substantial	Substantial

^a In relation to an AQAL

^b % change rounded to nearest whole number. Where the change is 0 (i.e. <0.5) the impact will be Negligible.

2.14 When considered at individual receptors, moderate or substantial impacts may be considered significant and Negligible or slight impacts not significant. Consideration of the overall effect on air quality needs to incorporate consideration of impacts as a whole, including the extent to which receptors represent sensitive locations and whether this wider impact is significant or not.

2.15 The assessment of overall significance is therefore made based on professional judgement, considering factors such as:

- The number of properties affected by different levels of impacts;
- The magnitude of any changes and descriptors (as identified in stages 1 and 2);
- Whether a new exceedance of an Air Quality Assessment Level ((AQAL) – see Table 3-1) is predicted to arise, or an existing exceedance is removed, or an existing exceedance is substantially increased or reduced;
- The level of uncertainty, including the extent to which worst-case assumptions have been made; and
- The extent of any exceedance of an AQAL.

2.16 Additional factors are also included in the assessment of significance, including the spatial extent of adverse impacts, in accordance with EPUK & IAQM guidance, which states:

"An individual property exposed to a moderately adverse impact might not be considered a significant, but many hundreds of properties exposed to a slight adverse impact could be."

Road Traffic Emissions: Impact (Sensitive Ecology)

2.17 There are several ecological receptors within proximity of the Site, most notably the River Avon Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC), the River Wylfe Local Nature Reserve (LNR), and the Smallbrook Meadows LNR.

2.18 IAQM guidance advocates a screening threshold of 200m from a road (the Affected Road Network (ARN)), which states if there are no qualifying features sensitive to air pollution within 200m of a road, then no further assessment is required. Against

this screening criteria, no further assessment is required at Smallbrook Meadows LNR.

- 2.19 In 2023 Land Use Consultants (LUC) prepared their 'Wiltshire Local Plan Review Habitats Regulations Assessment' (HRA) which concluded "*no likely significant effect to River Avon SAC... is predicted as a result of an increase in air pollution from proposed development in the Local Plan Review either alone or in-combination with other plans and projects.*"
- 2.20 In accordance with Paragraph 5.3.3 of the IAQM's 'A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites' it is appropriate to defer to the conclusions of the Local Plan HRA.
- 2.21 As a locally designated site, the River Wylfe LNR was not assessed in the overarching HRA, and project level assessment cannot be screened out against the 200m criteria. Therefore, a screening criteria of a change of 1,000 AADT has been used, either due to the development alone or in-combination, in accordance with IAQM guidance.
- 2.22 The Proposed Development will not increase AADT by 1,000 AADT on any road within 200m of the River Wylfe LNR and the change between the 2024 baseline and 2031 Do Something traffic flows (refer to Table 8-10) is also below 1,000 AADT. On this basis, no further assessment has been undertaken at the River Wylfe LNR.

Road Traffic Emissions: Exposure / Site Sensitivity

- 2.23 The Proposed Development will introduce new receptors which are sensitive to the long-term and short-term nitrogen dioxide (NO₂) and Particulate Matter (PM₁₀ and PM_{2.5}) AQALs. As such, detailed consideration has been given to potential exposure at the Site in the Do Something scenario.
- 2.24 With regard to the exposure assessment, professional judgement has been applied to determine whether exposure to air pollution is significant or not, based on the following criteria:
- Annual mean concentrations within 10% below or exceeding relevant AQAL = significant exposure;

- Annual mean concentrations more than 10% below relevant AQAL = not significant.

2.25 The 10% threshold around an AQAL is generally considered to be the range at which a 'risk of exceedance' is present, according to LAQM.TG (22).

Combustion Plant Emissions: Impacts

2.26 No known combustion plant is incorporated into the design of the Proposed Development. Therefore, no further consideration of combustion plant emissions has been undertaken.

Scope

Scoped In

2.27 The following elements have been included with the scope of the AQA due to the screening assessment identifying a risk of potential effects requiring further assessment:

1. Construction Phase
 - a. Construction Activities (Impacts)
 - i. Dust, PM₁₀
2. Operation Phase
 - a. Operation Traffic Emissions (Impacts)
 - i. Human Health
 - A. NO₂, PM₁₀, PM_{2.5}
 - b. Road traffic emissions (exposure)
 - i. NO₂, PM₁₀, PM_{2.5}

Scoped Out

2.28 The following elements have been excluded from the detailed scope of the AQA based on the outcome of the screening assessment:

1. Construction Phase
 - a. Construction Traffic Emissions (Impacts)

2. Operation Phase

a. Operation Traffic Emissions (Impacts)

i. Ecology

A. Oxides of nitrogen (NO_x), Ammonia (NH₃), nitrogen deposition, acid deposition.

b. Combustion Plant Emissions (Impacts)

i. NO₂, PM₁₀, PM_{2.5}

3 Policy, Legislation and Guidance

- 3.1 To inform the assessment the following Policy, Legislation, and Guidance have been considered:

Policy

National Planning Policy

National Planning Policy Framework

- 3.2 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The purpose of the planning system is to contribute to the achievement of sustainable development. To ensure this, the NPPF recognises 3 overarching objectives, including the following of relevance to air quality:

"Chapter 2 Achieving sustainable development

Para. 8

c) an environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

- 3.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment states that:

"Chapter 15 Conserving and enhancing the natural environment

Para. 187

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

[...]

preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Development should, wherever possible, help to improve local environmental conditions such as air and water quality;"

- 3.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

"Ground conditions and pollution

Para. 198

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. In doing so they should:

- A) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- B) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- C) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

Para. 199

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."

- 3.5 The implications of the NPPF have been considered throughout this assessment.

Local Planning Policy

The Local Plan

- 3.6 The Council's current adopted Local Plan is the Wiltshire Core Strategy adopted in 2015. This incorporates saved policies from former local plans in which the following policy is relevant to this assessment.

- 3.7 Core Policy 55: Air Quality states that:

"Development proposals, which by virtue of their scale, nature or location are likely to exacerbate existing areas of poor air quality, will need to demonstrate that measures can be taken to effectively mitigate emission levels in order to protect public health, environmental quality and amenity. Mitigation measures should demonstrate how they will make a positive contribution to the aims of the Air Quality Strategy for Wiltshire and where relevant, the Wiltshire Air Quality Action Plan. Mitigation may include:

- i. landscaping, bunding or separation to increase distance from highways and junctions*
- ii. possible traffic management or highway improvements to be agreed with the local authority*
- iii. abatement technology and incorporating site layout/separation and other conditions in site planning*
- iv. traffic routing, site management, site layout and phasing*

- v. *where appropriate, contributions will be sought toward the mitigation of the impact a development may have on levels of air pollutants”*

Legislation

- 3.8 There are two sets of air quality legislation which include ambient air quality thresholds for the protection of public health that apply in England, these include legally binding limit values originally set by the European Union (EU) Directive on ambient air quality and cleaner air for Europe (2008/50/EC) (which were transposed into UK law through the Air Quality Standards Regulations 2010), and regulations implementing national air quality objectives as set out in the Air Quality Strategy (AQS) 2023 for England which local authorities are required to work towards achieving.
- 3.9 The AQS sets out the government’s policies and framework for improving air quality in the UK with the aim of meeting the requirements of the 2008/50/EC Directive. The AQS also outlines the Limit Values, Target Values, Standards, Objectives, Critical Levels, and Exposure Reduction Targets for the protection of human health and the environment.
- 3.10 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 also brought forward a new target level for PM_{2.5}.
- 3.11 The relevant Limit Values, Target Values, Standards, Objectives, Critical Levels and Exposure Reduction Targets are collectively termed AQALs throughout this report.

Table 3-1: Air Quality Assessment Levels (AQALs)

Pollutant	AQAL	
	Concentration (µg/m³)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean

Pollutant	AQAL	
	Concentration (µg/m³)	Averaging Period
PM _{2.5}	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
	20	Annual mean
	10	Annual Mean Interim Target ((AMIT) to be met across England by 2030)
	10	Annual Mean Concentration-Target (AMCT) - To be met across England by 2040
	-	Population Exposure Reduction-Target (PERT) - 35% reduction in population exposure by 2030 (compared to a base year of 2018)

3.12 With specific reference to the AMIT and AMCT for PM_{2.5}, it should be noted that that the dates for compliance are 2030 and 2040, respectively. The applicable PM_{2.5} AQAL for the purposes of this assessment therefore remains to be the current AQAL of 20µg/m³.

3.13 However, in line with the Defra "PM_{2.5} Interim Planning Guidance on the consideration of the Environment Act PM_{2.5} targets in planning decisions" the operation phase assessment will also aim to consider the 2040 AMCT for PM_{2.5}, identify key sources of PM_{2.5} air pollution from the Proposed Development, and outline the measures proposed to minimise emissions of PM_{2.5} and its precursors as far as is reasonably practicable.

Guidance

National Guidance

National Planning Practice Guidance

3.14 Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG), which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality.

3.15 The NPPG summarises the importance of air quality in planning and the key legislation relating to it.

Defra Technical Guidance

3.16 Table 3-2 summarises the advice provided in Defra's Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22)) on where the AQALs for pollutants considered within this report apply.

Table 3-2: Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes, etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Non-statutory guidance

3.17 The following guidance documents have been reviewed / followed / referred to in preparing this AQA:

- The EPUK & IAQM 'Land use Planning & Development Control: Planning for Air Quality', (2017 V1.2);
- The IAQM's 'Assessment of dust from demolition and construction' (2024 V2.2);
- The IAQM's 'A guide to the assessment of air quality impacts on designated nature sites' (2020);
- The JNCC's 'Guidance on Decision-making Thresholds for Air Pollution' (2021); and
- Wiltshire Council 'Air Quality Supplementary Planning Document (SPD)' (2023).

4 Baseline Conditions

- 4.1 Existing air quality conditions in the vicinity of the Site were identified to provide a baseline for the assessment. These are detailed in the following sections.
- 4.2 The Site is located to the east of Warminster, adjacent to the settlement boundary, on land to the north of Boreham Road. The Site is bound by farmland and MOD sports facilities to the north, Bishopstrow Hotel / grounds to the east, Boreham Road and existing residential properties to the south / west.

Local Air Quality Management

- 4.3 As required by the Environment Act (1995), as amended by the 2021 Environment Act, the Council has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQAL within the County. As such, eight AQMAs are currently declared. The Proposed Development is not located within or within proximity of any of these AQMAs.
- 4.4 The closest AQMA is the Westbury AQMA located ~6.5 km north of the Site.

Air Quality Monitoring

- 4.5 Within the desk-based review it was identified that WC had historically undertaken local monitoring within Warminster on behalf of Somerset Council (SC) at diffusion tube '47' until 2020, when monitoring appears to have been decommissioned.
- 4.6 More recent monitoring of pollutant concentrations is undertaken by WC throughout their area of authority, and the closest data available for baseline review are located in Westbury. Annual mean NO₂ results taken from readily available information online are shown in Figure 4-1 and Table 4-1. Exceedances of the relevant AQALs are shown in bold.

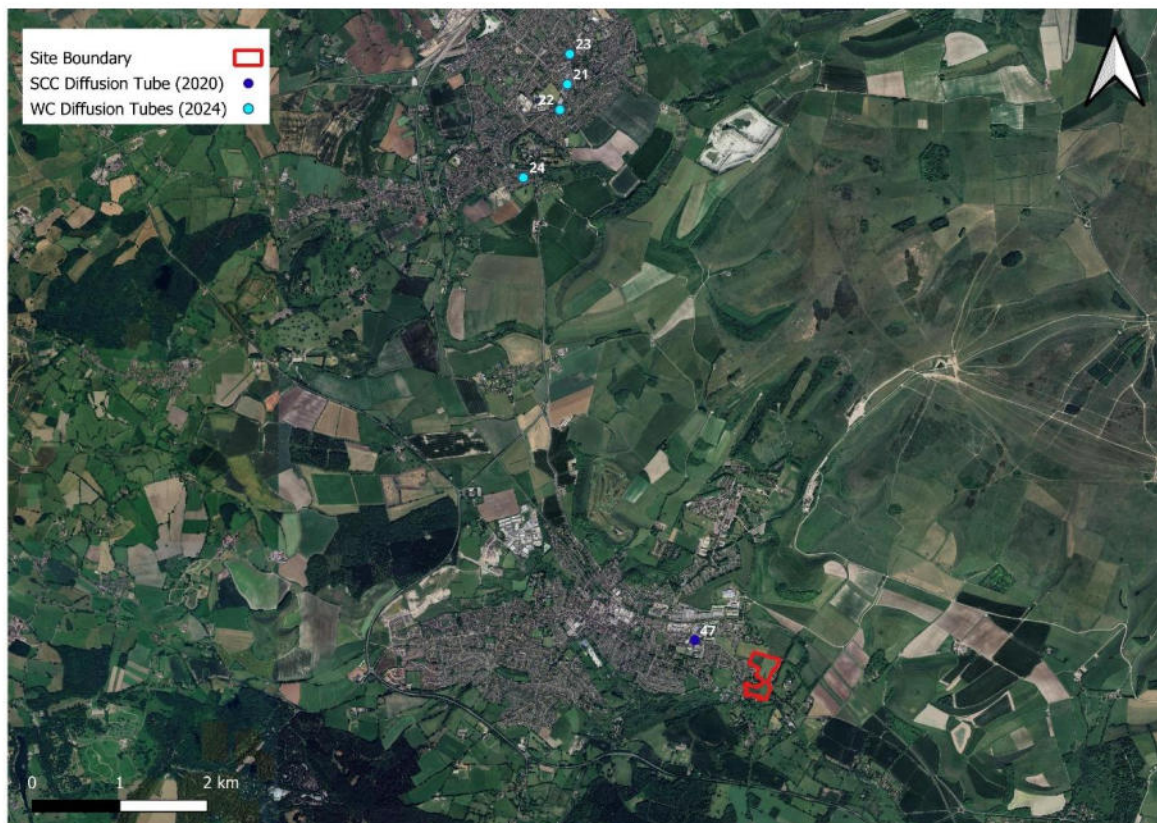


Figure 4-1: Local Monitoring

Table 4-1: Local Monitoring – NO₂

Site ID	Site Name	Monitor Type	Monitored NO ₂ Concentration (µg/m ³)				
			2020	2021	2022	2023	2024
24	Leighton Pk (bg), Westbury	Suburban Diffusion Tube	8.3	8.3	8.9	8.5	6.5
22	Warminster Rd	Roadside Diffusion Tube	36.3	40.4	36.0	31.6	29.9
21	41 Haynes Rd, Westbury	Roadside Diffusion Tube	29.9	33.3	30.0	25.9	23.5
23	23 West End, Westbury	Roadside Diffusion Tube	25.1	26.1	24.9	21.4	19.7
47	Woodcock Rd, Warminster	Roadside Diffusion Tube	9.5	N/A	N/A	N/A	N/A

4.7 As shown in Table 4-1, monitored NO₂ concentrations have not exceeded the AQAL of 40 µg/m³ in recent years, with the exception of local monitor '22' in 2021.

- 4.8 As a result of the Covid-19 pandemic and associated behavioural changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.), it is widely acknowledged that measured concentrations during 2020 are not considered to be representative of 'normal' conditions. As such, historic data at diffusion tube '47' are not considered representative of current baseline conditions. However, historic monitoring did show that annual mean NO₂ concentrations were consistently below the AQAL.
- 4.9 While monitoring data in Westbury are roughly 6.6km north of Warminster, they are considered to be appropriate for general baseline review due to comparable pollution sources, likely background conditions and dispersion characteristics.
- 4.10 However, Westbury monitoring is not considered representative of site-specific baseline conditions, which has been determined through the operation phase modelling assessment presented in section 5.
- 4.11 Monitoring of PM₁₀ and PM_{2.5} is not currently undertaken within the vicinity of the development.

Background Pollution Concentrations

- 4.12 Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by Defra for the entire of the UK to assist local authorities (Las) in their review and assessment of air quality.
- 4.13 The Site is located in grid square NGR: 389500, 144500. Data for this location was downloaded from the Defra website for the purpose of this assessment and is summarised in Table 4-2.
- 4.14 Background concentrations have been provided for 2024 (the year latest local monitoring data is available), 2025 (the year of assessment), and 2031 (the assessed completion year).

Table 4-2: Background Pollution Concentrations

Pollutant	Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)		
	2024	2025	2031
NO ₂	4.9	4.7	3.8
PM ₁₀	10.6	10.5	10.0
PM _{2.5}	6.3	6.2	5.8

4.15 As shown in Table 4-2, predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQALs at the development site.

Sensitive Receptors

4.16 A sensitive receptor is defined as any location which may be affected by changes in air quality because of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase

4.17 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk top study of the area up to 250m from the Site boundary. These are summarised in Table 4-3. The Proposed Development will not involve any on-site demolition.

Table 4-3: Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate No. of Human Receptors	Approximate No. of Ecological Receptors
<20	10-100	0
<50	10-100	0
<100	10-100	N/A
<250	> 100	N/A

- 4.18 Receptors sensitive to potential dust impacts from trackout were identified from a desk top study of the area up to 50m from the road network within 250m of the Site access. These are summarised in Table 4-4.

Table 4-4: Trackout Dust Sensitive Receptors

Distance from Trackout (m)	Approximate No. of Human Receptors	Approximate No. of Ecological Receptors
<20	10 – 100	1
<50	10 – 100	1

- 4.19 There is one ecological receptor within 20m of the access route within 250m of the Site entrance, The River Avon SAC and SSSI. As per the IAQM's Guidance on the Assessment of Dust from Demolition and Construction, SACs classify as 'High' sensitive ecological receptors, as such they are subject to assessment in relation to the potential for impacts to arise during the construction phase.
- 4.20 Several additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 4-5.

Table 4-5: Additional Area Sensitivity Factors to Potential Dust Impacts

Factor	Comment
Whether there is any history of dust generating activities in the area.	The desk top study did not indicate any dust generating activities in the local area.
The likelihood of concurrent dust generating activity on nearby sites.	A review of the local planning portal did not highlight any additional dust generating activities that may be concurrently present at the time of construction.
Pre-existing screening between the source and the receptors.	There is no pre-existing screening between the Site and surrounding receptors.
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place.	The predominant wind bearing at the Site is from the southwest. As such, receptors to the northeast are most likely to be affected by dust releases. As shown in Figure 8-1.
Conclusions drawn from local topography.	There are no significant topographical constraints to dust dispersion.
Duration of the potential impact, as a receptor may become more sensitive over time.	Currently it is unknown as to the duration of the construction phase. However, it is possible that it will extend over 3 - 4 years.

Factor	Comment
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline assessment.

Operation Phase

Human Health

- 4.21 Relevant sensitive locations are those where members of the public will be regularly present over the averaging period of the relevant AQALs. Sensitive locations considered include existing residential properties. The following sensitive receptors were identified for inclusion within the operation phase assessment.

Table 4-6: Operation Phase Existing Receptors (Human)

Receptor	Description	Coordinates		Height (m)
		X	Y	
R1	Residential property adjacent to Boreham Road	389432	144184	1.5
R2	Residential property adjacent to Boreham Road	389385	144183	1.5
R3	Residential property adjacent to Boreham Road	389359	144186	1.5
R4	Residential property adjacent to Boreham Road	389343	144171	1.5
R5	Residential property adjacent to Boreham Road	389378	144170	1.5
R6	Residential property adjacent to Boreham Road	389405	144172	1.5
R7	Residential property adjacent to Boreham Road	389237	144217	1.5

Table 4-7: Operation Phase Proposed Receptors (Human)

Receptor	Description	Coordinates		Height (m)
		X	Y	
SB1	Southern edge of Site boundary	389253	144210	1.5
SB2	Southern edge of Site boundary	389480	144178	1.5
SB3	Southern edge of Site boundary	389433	144178	1.5

5 Predicted Impacts

Construction Phase

- 5.1 The sensitivity of the receiving environment to potential dust impacts is shown in Table 5-1.

Table 5-1: Sensitivity of the Surrounding Area to Potential Dust Impacts

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

- 5.2 In relation to human health, as shown in Table 4-2, background concentrations of PM₁₀ are < 24 µg/m³, therefore when considering the number of sensitive receptors within 20 m of the Site, the sensitivity has been classified as Low.
- 5.3 The sensitivity of ecological receptors has been defined as being a high, due to the River Avon being classified as a SAC.

Demolition

- 5.4 The development proposals do not include any demolition activity. As such, no assessment of impacts has been undertaken.

Earthworks

- 5.5 Table 5-2 shows the evaluation of the potential magnitude of impacts from earthworks activities.

Table 5-2: Earthworks Emissions Magnitude

Category	Criteria	Evaluation
Large	Total site area greater than 110,000m ² .	Yes
	Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size).	
	More than 10 heavy earth moving vehicles active at any one time.	
	Formation of bunds greater than 6m in height.	
Medium	Total site area 18,000m ² to 110,000m ² .	No
	Moderately dusty soil type (e.g., silt).	
	5 to 10 heavy earth moving vehicles active at any one time.	
	Formation of bunds 3m to 6m in height.	
Small	Total site area less than 18,000m ² .	No
	Soil type with large grain size (e.g., sand).	
	Less than 5 heavy earth moving vehicles active at any one time.	
	Formation of bunds less than 3m in height.	

Category	Criteria	Evaluation
	Earthworks during wetter months.	

- 5.6 The potential magnitude of impacts from earthworks activities is estimated to be Large.

Construction

- 5.7 Table 5-3 shows the evaluation of the potential magnitude of impacts from construction activities.

Table 5-3: Construction Emissions Magnitude

Category	Criteria	Evaluation
Large	Total building volume greater than 75,000m ³	Yes
	On site concrete batching	
	Sandblasting	
Medium	Total building volume 12,000m ³ to 75,000m ³	No
	Potentially dusty construction material (e.g., concrete)	
	On site concrete batching	
Small	Total building volume less than 12,000m ³	No
	Construction material with low potential for dust release (e.g., metal cladding or timber)	

- 5.8 The potential magnitude of impacts from construction activities is estimated to be Large.

Trackout

5.9 Table 5-4 shows the evaluation of the potential magnitude of impacts from trackout activities.

Table 5-4: Trackout Emissions Magnitude

Category	Criteria	Evaluation
Large	More than 50 HDV trips per day	No
	Potentially dusty surface material (e.g., high clay content)	
	Unpaved road length greater than 100m	
Medium	20 to 50 HDV trips per day	Yes
	Moderately dusty surface material (e.g., high clay content)	
	Unpaved road length 50m to 100m	
Small	Less than 20 HDV trips per day	No
	Surface material with low potential for dust release	
	Unpaved road length less than 50m	

5.10 The potential magnitude of impacts from trackout activities is estimated to be Medium.

Summary of Potential Unmitigated Dust Risks

5.10 A summary of the risk from each dust generating activity is provided in Table 5 5:

Table 5-5: Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk			
	Earthworks	Construction	Trackout	Overall
Magnitude / Sensitivity	Large	Large	Medium	Large

Potential Impact		Risk			
		Earthworks	Construction	Trackout	Overall
Dust Soiling	High	High	High	Medium	High
Human Health	Low	Low	Low	Low	Low
Ecology	Low / High (Trackout)	Low	Low	Medium	Medium
Overall					High

- 5.11 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the Site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during most of the construction phase.

Operation Phase

Road Traffic Emissions: Impact (Human Health)

- 5.12 Annual mean NO₂, PM₁₀ and PM_{2.5} concentrations modelled at existing receptor locations (as set out in Table 4-7) in the 2031 Do Minimum (DM) and 2031 Do Something (DS) scenarios (as set out in Appendix B) are set out below.

Nitrogen dioxide (NO₂)

- 5.13 The data in Table 5-5 shows that modelled annual mean NO₂ concentrations are below the AQAL at all existing receptor locations.

Table 5-6: Predicted Annual Mean Concentration of NO₂ Due to Development

Receptor	DM (µg/m ³)	DS (µg/m ³)	Change (µg/m ³)	DS % of AQAL	% Change of AQAL	Impact
R1	6	6	<0.1	15.0%	0.0	Negligible Neutral

Receptor	DM ($\mu\text{g}/\text{m}^3$)	DS ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	DS % of AQAL	% Change of AQAL	Impact
R2	7	7	<0.1	17.5%	0.0	Negligible Neutral
R3	6	7	1.0	17.5%	2.5	Negligible Adverse
R4	5	5	<0.1	12.5%	0.0	Negligible Neutral
R5	6	6	<0.1	15.0%	0.0	Negligible Neutral
R6	7	7	<0.1	17.5%	0.0	Negligible Neutral
R7	7	7	<0.1	17.5%	0.0	Negligible Neutral

5.14 Traffic generated by the Proposed Development is predicted to increase annual mean NO_2 concentrations by no more than $1.0 \mu\text{g}/\text{m}^3$, and is classed as a Negligible impact based on the EPUK & IAQM criteria set out in Table 2-2.

5.15 Based on the predicted annual mean NO_2 concentrations, the 1-hour objective is also unlikely to be exceeded at all the selected receptors and impacts on short term NO_2 will also be Negligible.

Particulate matter (PM_{10})

5.16 The data in Table 5-6 shows that modelled annual mean PM_{10} concentrations are below the AQAL at all the selected receptor locations

Table 5-7: Predicted Annual Mean Concentration of PM_{10} Due to Development

Receptor	DM ($\mu\text{g}/\text{m}^3$)	DS ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	DS % of AQAL	% Change of AQAL	Impact
R1	12	12	<0.1	30.0%	0.0	Negligible Neutral
R2	12	12	<0.1	30.0%	0.0	Negligible Neutral
R3	12	12	<0.1	30.0%	0.0	Negligible Neutral
R4	11	11	<0.1	27.5%	0.0	Negligible Neutral

Receptor	DM ($\mu\text{g}/\text{m}^3$)	DS ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	DS % of AQAL	% Change of AQAL	Impact
R5	11	12	1.0	30.0%	2.5	Negligible Adverse
R6	12	13	1.0	32.5%	2.5	Negligible Adverse
R7	12	13	1.0	32.5%	2.5	Negligible Adverse

5.17 Traffic generated by the Proposed Development is predicted to increase annual mean PM_{10} concentrations by no more than $1.0 \mu\text{g}/\text{m}^3$, and is classed as a Negligible impact based on the EPUK & IAQM criteria set out in Table 2-2.

5.18 Based on the predicted annual mean NO_2 concentrations, the 1-hour objective is also unlikely to be exceeded at all the selected receptors and impacts on short term NO_2 will also be Negligible.

5.19 With a similar approach to NO_2 , the LAQM.TG(22) recommends that where annual mean PM_{10} concentrations fall below $32 \mu\text{g}/\text{m}^3$ the 24-hour AQAL is unlikely to be exceeded. Based on predicted annual mean PM_{10} concentrations the 24-hour AQAL is unlikely to be exceeded at any of the receptor locations and impacts on short term PM_{10} will be Negligible.

Particulate matter ($\text{PM}_{2.5}$)

5.20 In the absence of guidance on how to assess the impact of $\text{PM}_{2.5}$ concentrations, the percentage change has not been assessed and total concentrations in the Do Something scenario are presented in the context of the relevant AQALs only.

5.21 The data in Table 5-7 shows that modelled annual mean $\text{PM}_{2.5}$ concentrations are below all relevant annual mean AQALs at all receptor locations:

Table 5-8: Predicted Annual Mean Concentrations of $\text{PM}_{2.5}$ Due to Development

Receptor	DM ($\mu\text{g}/\text{m}^3$)	DS ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	DS % of AQAL	% Change of AQAL	Impact
R1	7	7	<0.1	35.0%	0.0	Negligible Neutral

Receptor	DM ($\mu\text{g}/\text{m}^3$)	DS ($\mu\text{g}/\text{m}^3$)	Change ($\mu\text{g}/\text{m}^3$)	DS % of AQAL	% Change of AQAL	Impact
R2	7	7	<0.1	35.0%	0.0	Negligible Neutral
R3	7	7	<0.1	35.0%	0.0	Negligible Neutral
R4	6	6	<0.1	30.0%	0.0	Negligible Neutral
R5	7	7	<0.1	35.0%	0.0	Negligible Neutral
R6	7	7	<0.1	35.0%	0.0	Negligible Neutral
R7	7	7	<0.1	35.0%	0.0	Negligible Neutral

5.22 Annual mean concentrations are below the relevant AQALs, including the AMIT of 10 $\mu\text{g}/\text{m}^3$ which applies from 2030.

Road Traffic Emissions: Exposure / Site Sensitivity

5.23 The data in Table 5-8 shows that modelled annual mean NO_2 concentrations are below the AQAL at all proposed receptor locations:

Table 5-9: Predicted Concentration of NO_2 Within the Development

Receptor	DS ($\mu\text{g}/\text{m}^3$)	AQAL ($\mu\text{g}/\text{m}^3$)
SB1	8	40
SB2	7	40
SB3	8	40

5.24 Additionally, based on the predicted annual mean NO_2 concentrations, the 1-hour objective is also unlikely to be exceeded within the Proposed Development and impacts on short term NO_2 will also be Negligible.

Particulate matter (PM₁₀)

5.25 The data in Table 5-9 shows that modelled annual mean PM₁₀ concentrations are below the AQAL at all proposed receptor locations

Table 5-10: Predicted Concentration of PM₁₀ Within the Development

Receptor	DS (µg/m³)	AQAL (µg/m³)
SB1	13	40
SB2	12	40
SB3	13	40

5.26 Additionally, with a similar approach to NO₂, the LAQM.TG(22) recommends that where annual mean PM₁₀ concentrations fall below 32 µg/m³ the 24-hour AQAL is unlikely to be exceeded. Based on predicted annual mean PM₁₀ concentrations the 24-hour AQAL is unlikely to be exceeded at any of the proposed receptor locations and impacts on short term PM₁₀ will be Negligible

Particulate matter (PM_{2.5})

5.1 The data in Table 5-10 shows that modelled annual mean PM_{2.5} concentrations are below all relevant annual mean AQALs at all Proposed Development receptor locations:

Table 5-11: Predicted Concentration of PM_{2.5} Within the Development

Receptor	DS (µg/m³)	AQAL (µg/m³)	
		Annual Mean	Interim Target (2030)
SB1	8	20	10
SB2	7	20	10
SB3	8	20	10

5.2 Annual mean concentrations are below the relevant AQALs.

6 Mitigation

Construction Phase

The full list of recommended mitigation measures for a 'High' classification risk Site, as outlined within the IAQM guidance, is provided in Appendix C.

Operation Phase

- 6.1 No secondary mitigation measures are needed to manage the future exposure of residents to air pollution.

7 Conclusions

Construction Phase

- 7.1 Subject to the implementation of all relevant mitigation measures outlined in Appendix C, the residual impacts from dust generating activities are predicted to be not significant, in accordance with the IAQM guidance.

Operation Phase

- 7.1 Impacts from operation phase road traffic emissions are considered not significant, and future residents at the Proposed Development are considered unlikely to be exposed to pollution concentrations above AQALs.

Overall

- 7.2 The impact and residual effect of the Proposed Development on air quality has been considered in the context of compliance with National Planning Policy as follows:

Table 7-1: Policy Compliance

Criteria	Evaluation	Comment
Do the proposals include new development that contributes to unacceptable levels of air pollution at other new development?	No	Positive outcome
Do the proposals include new development that is being put at unacceptable risk from unacceptable levels of air pollution?	No	Positive outcome
Do the proposals include new development that is adversely affected by unacceptable levels of air pollution?	No	Positive outcome
Do the proposals contribute to unacceptable levels of air pollution at existing development?	No	Positive outcome
Do the proposals put existing development at unacceptable risk from unacceptable levels of air pollution?	No	Positive outcome
Do the proposals sustain and contribute towards compliance with relevant limit values or national objectives for pollutants?	Yes	Positive outcome
Have opportunities to improve air quality or mitigate impacts been identified?	Yes	Positive outcome
Are the proposals consistent with the local air quality action plan?	Yes	Positive outcome

Criteria	Evaluation	Comment
Have air pollution risks been properly considered and adequate mitigation included to ensure there are no adverse impacts as a result of the development?	Yes	Positive outcome

7.3 The Proposed Development is considered therefore to fully comply with planning requirements.

8 Further Work

Pre-Construction

8.1 The following work is committed as part of the delivery of Construction Phase mitigation:

1. Stakeholder Communications Plan
2. Dust Management Plan
3. Monitoring of dust deposition, dust flux, real-time PM₁₀ continuous monitoring
 - a. To commence at least 3 months before site work
4. Construction Logistics Plan
5. Travel Plan
 - a. Which should include Type 2 travel plan mitigation measures outlined within WC's Air Quality SPD.

Appendix A: Construction Phase Methodology

Step 1

Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Should human receptors be identified within 250m of the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route, then the assessment also proceeds to Step 2.

Step 2a - Potential Dust Emission Magnitude

Step 2a determines the potential for dust to arise during the construction phase. Activities on construction sites with the potential to generate dust can be categorised into 4 types of activities:

- Demolition – any activities associated with the removal of existing structures on the Site;
- Earthworks – includes the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction – any activities relating to the provision of new structures on the Site; and
- Trackout – the transport of dust and dirt from the Site onto the public road network where it may be deposited and re-suspended by vehicle traffic.

The potential dust emission magnitude for each of the activities is determined by the scale and magnitude of the works, and are classified as small, medium or large depending on the criteria outlined below in Table 8-1.

Table 8-1: Construction Dust - Magnitude of Emission

Activity	Potential Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <12,000m ³ , construction material with low potential for dust release (e.g., metal cladding or timber), demolition activities <6m above ground, demolition during wetter months	Total building volume 12,000 m ³ – 75,000m ³ , potentially dusty construction material, demolition activities 6-12m above ground level	Total building volume >75,000m ³ , potentially dusty construction material (e.g., concrete), on Site crushing and screening, demolition activities >12m above ground level
Earthworks	Total Site area <18,000m ² , soil type with large grain size, <5 heavy earth moving vehicles active at any one time, formation of bunds <3m in height	Total Site area 18,000m ² – 110,000m ² , moderately dusty soil type, 5-10 heavy earth moving vehicles, formation of bunds 3m – 6m in height	Total Site area >110,000m ² , potentially dusty soil type (such as clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles, formation of bunds >6m
Construction	Total building volume <12,000m ³ , construction material with low potential for dust release (such as metal cladding or timber)	Total building volume 12,000m ³ – 75,000m ³ , potentially dusty construction material (such as concrete), on Site concrete batching	Total building volume >75,000m ³ , on Site concrete batching, sandblasting
Trackout	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved roads <50m	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (such as high clay content), unpaved road length 50m – 100m	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (such as high clay content), unpaved road length >100m

Step 2b - Sensitivity of the Area to Construction Dust

Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors to determine individual receptor sensitivities are shown in Table 8-2.

Table 8-2: Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	Users expect of high levels of amenity. High aesthetic or value property. People expected to be present continuously for extended periods of time. Locations where members of the public are exposed over a time period relevant to the AQAL for PM₁₀. e.g., residential properties, hospitals, schools, and residential care homes.	Internationally or nationally designated site e.g., Special Area of Conservation.
Medium	Users would expect to enjoy a reasonable level of amenity. Aesthetics or value of their property could be diminished by soiling. People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g., parks and places of work.	Nationally designated site e.g., Sites of Special Scientific Interest.
Low	Enjoyment of amenity would not reasonably be expected. Property would not be expected to be diminished in appearance. Transient exposure, where people would only be expected to be present for limited periods. e.g., public footpaths, playing fields, shopping streets, farmland, short term car parks and roads.	Locally designated site e.g., Local Nature Reserve.

The sensitivity of the area is defined separately for dust soiling impacts, human health impacts and ecological impacts according to the criteria shown in the following tables, derived from IAQM guidance.

Table 8-3: Sensitivity of the Area to Dust Soiling

Receptor Sensitivity	No. of Receptors	Distance from the 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 8-4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	No. 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
		1-10	High	Medium	Low	Low
	28-32 µg/m ³	>100	High	High	Medium	Medium
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m ³	>100	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	No. of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
Medium		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	>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
		<1	Low	Low	Low	Low
Low	-	<1	Low	Low	Low	Low

Table 8-5: Sensitivity of the Area to Ecological Impacts

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

Step 2c - Risk of Impacts

Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without mitigation (i.e., excluding embedded mitigation), according to the matrices below.

The risk of impacts is determined for each of the 4 activities using the matrices prescribed in the IAQM guidance, as reproduced below:

Table 8-6: Dust Risk Category from Demolition Activities

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

Table 8-7: Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 8-8: Dust Risk Category from Trackout Activities

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
High	High	Medium	Low

Receptor Sensitivity	Distance from the Source (m)		
	Large	Medium	Small
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Step 3

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with Negligible risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final Step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects using effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be not significant.

Appendix B: Operation Phase Methodology

Overview

Table 8-9: ADMS-Roads Model Inputs Processing Tools

Model Input Parameter	Details
Model Version	A detailed AQA has been undertaken using the air dispersion model ADMS-Roads. The software is commercially available, has been accepted for this type of assessment by Defra and is used extensively for AQA's. ADMS-Roads is able to provide an estimate of ambient pollution concentrations, considering important input data such as background pollutant concentrations, variable emissions, meteorological data, and traffic flows.
Assessment Scenarios	The following scenarios have been assessed: 2024 Baseline scenario (for the purposes of model verification); 2031 Do Minimum scenario and 2031 Do Something scenario using 2031 backgrounds (latest available from Defra).
Emission Factor Toolkit (EFT)	Emission rates for NO_x, PM₁₀ and PM_{2.5} used in the dispersion modelling assessment were calculated from the latest EFT (v.13.1) which was released in March 2025. Most modern vehicles on the road in the UK meet a particular Euro emissions standard from 1 – 6, with 6 being the newest. Different parts of the country have newer or older vehicles than others. This is defined as the "fleet". The EFT estimates this primarily based on whether the location is within or outside London or in England, Wales or Scotland. In the case of this model the vehicle fleet used was defined as either "England (urban)" for the impact assessment study area. When predicting future year emissions, the toolkit includes forecasts such as anticipated advances in vehicle technology and changes in vehicle fleet composition, which assumes that vehicle emissions will reduce over time. However, there is some uncertainty over the accuracy of the future predictions.
Surface Roughness	The following surface roughness parameters have been applied in the model: - Dispersion site surface roughness = 0.5m (ADMS pre-set for 'Parkland, open suburbia'); - Met site surface roughness = 0.3m (to reflect the more open location of the measurement station).
Meteorological Data	To calculate pollutant concentrations, ADMS-Roads requires hourly sequential meteorological data, including wind direction, wind speed, temperature, cloud cover and stability, which exert significant influence over atmospheric dispersion.

Model Input Parameter	Details
	The assessment has been undertaken using 2024 meteorological data from Larkhill Meteorological Station, which is the closest and most representative meteorological station which records all of the parameters necessary for dispersion modelling. Where data capture is missing, data has been infilled from Boscombe Down.
Minimum Monin-Obukhov Length	The following Minimum Monin-Obukhov (MO) lengths were applied: • Dispersion site = 10m (ADMS pre-set for 'Small towns'). • Met Site = 1m
Surface Albedo	0.23 (model default)
NO _x to NO ₂ conversion	Ambient NO _x concentrations have been predicted through dispersion modelling. Annual NO _x concentrations have been converted using Defra's NO _x to NO ₂ conversion tool version 9.1. Total NO ₂ was determined by adding the calculated background NO ₂ concentration to the modelled road contribution NO _x .
Background Concentrations	Defra UK-AIR modelled background concentrations for the relevant grid square and assessment years were the appropriate source of background concentrations in the dispersion modelling assessment. Annual mean background NO ₂ , PM ₁₀ and PM _{2.5} concentrations were therefore derived from this dataset for 2024 and 2031.

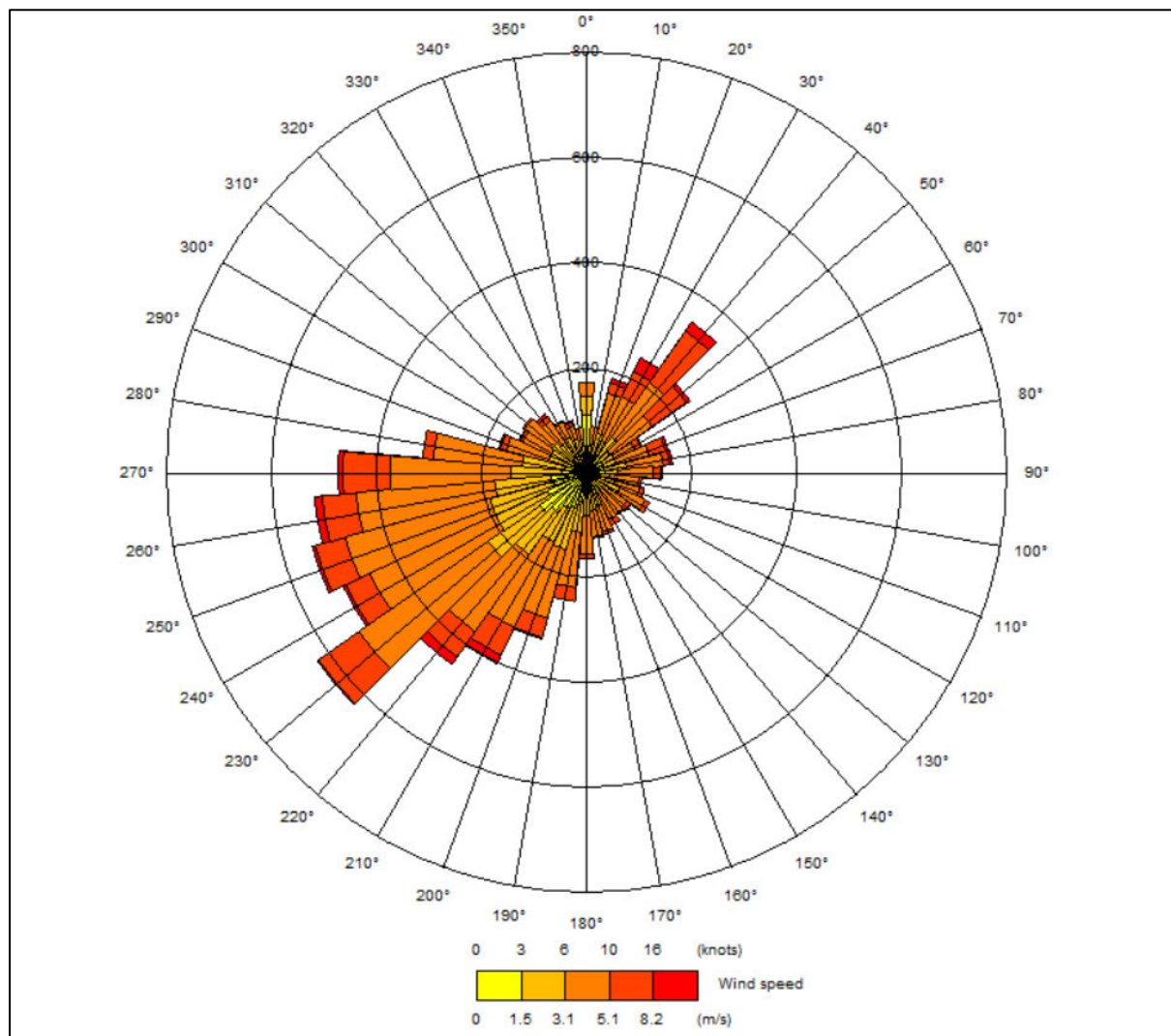


Figure 8-1: Modelled Windrose – Larkhill (Boscombe Down)

Modelled Roads and Traffic Profile

The modelled road network is shown below in Figure 8-2.

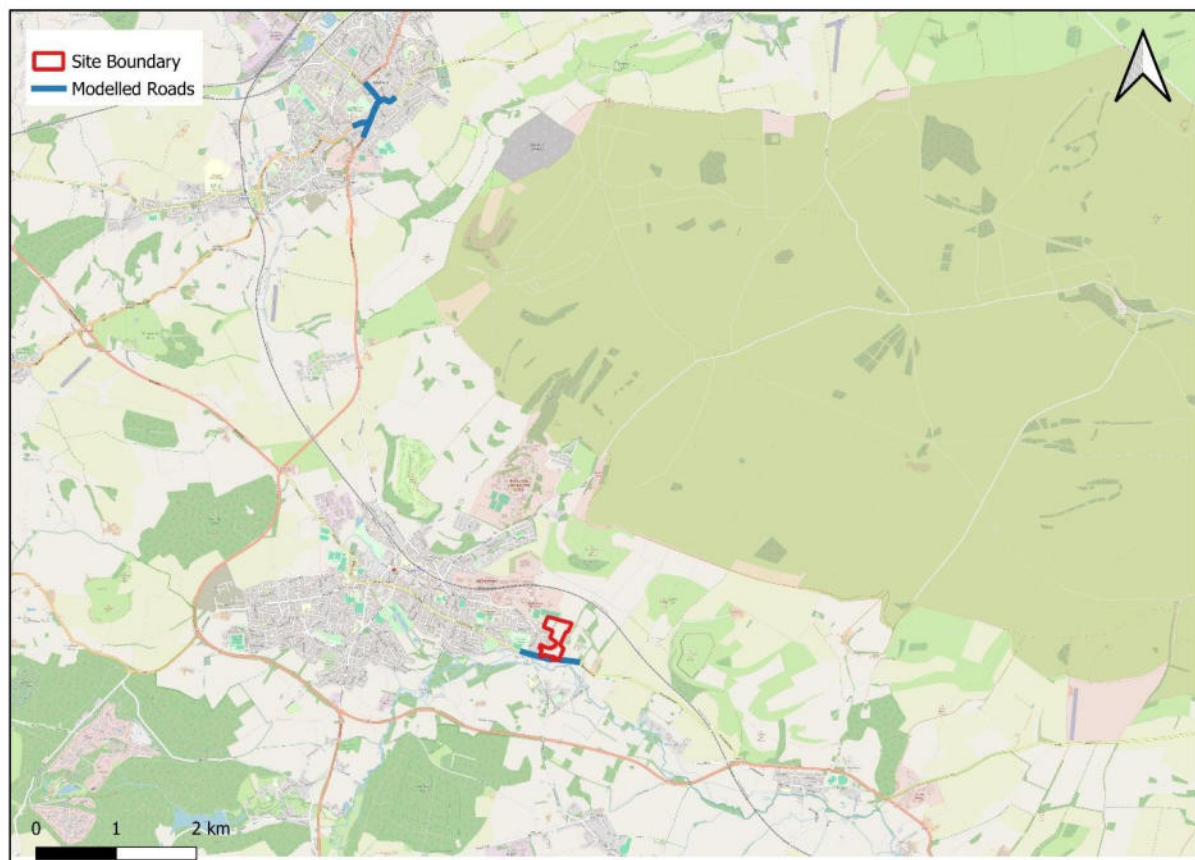


Figure 8-2: Modelled Roads

Traffic data used in the ADMS modelling assessment is set out in Table 8-10. The traffic data used in the assessment was provided by (ACE).

Table 8-10: Traffic Data used in ADMS Model

Road Link	2024 Base		2031 Do Minimum		2031 Do Something	
	AADT	HDV %	AADT	HDV %	AADT	HDV %
Boreham Road (East of Access)	4,662	3	5,035	3	5,282	3
Boreham Road (West of Access)	4,662	3	5,035	3	5,604	3
Haynes Road	12,398	9	N/A	N/A	N/A	N/A
Bratton Road	1,378	2	N/A	N/A	N/A	N/A

Road Link	2024 Base		2031 Do Minimum		2031 Do Something	
	AADT	HDV %	AADT	HDV %	AADT	HDV %
Warminster Road (South of Bratton Road)	13,776	7	N/A	N/A	N/A	N/A
Leigh Road	4,104	2	N/A	N/A	N/A	N/A
Warminster Road (South of Leigh Road)	10,440	9	N/A	N/A	N/A	N/A

Model Verification

An important stage in the modelling process is model verification, which involves comparing the model output with measured concentrations to increase confidence in modelled predictions. The nearest and most recent monitoring to the Site is currently undertaken in Westbury, which is a similar size town and has therefore been assumed to be broadly representative of Warminster for the purposes of model verification. Model verification was undertaken using 2024 diffusion tube data from WC monitoring locations.

It is most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides ($\text{NO}_x = \text{NO} + \text{NO}_2$). The model output of road- NO_x (i.e., the component of total NO_x coming from road traffic) has been compared with the 'measured' road- NO_x .

The pre-adjusted modelled and monitored verification results are shown in Table 8-11:

Table 8-11: Modelled and Monitored Concentrations

Monitoring ID	Modelled Road- NO_x ($\mu\text{g}/\text{m}^3$)	Monitored Road- NO_x ($\mu\text{g}/\text{m}^3$)	Ratio	Modelled Total NO_2 ($\mu\text{g}/\text{m}^3$)	Monitored Total NO_2 ($\mu\text{g}/\text{m}^3$)	Difference (%)
21	11.1	38.3	3.4	12.1	23.5	-49
22	11.1	59.1	5.3	10.9	29.9	-64

As shown, modelled concentrations of NO_x and NO_2 were both underpredicted by the model at all diffusion tube monitoring locations.

As such, an adjustment factor of **4.385** has been determined as the equation of the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution of NO_x, as shown below:

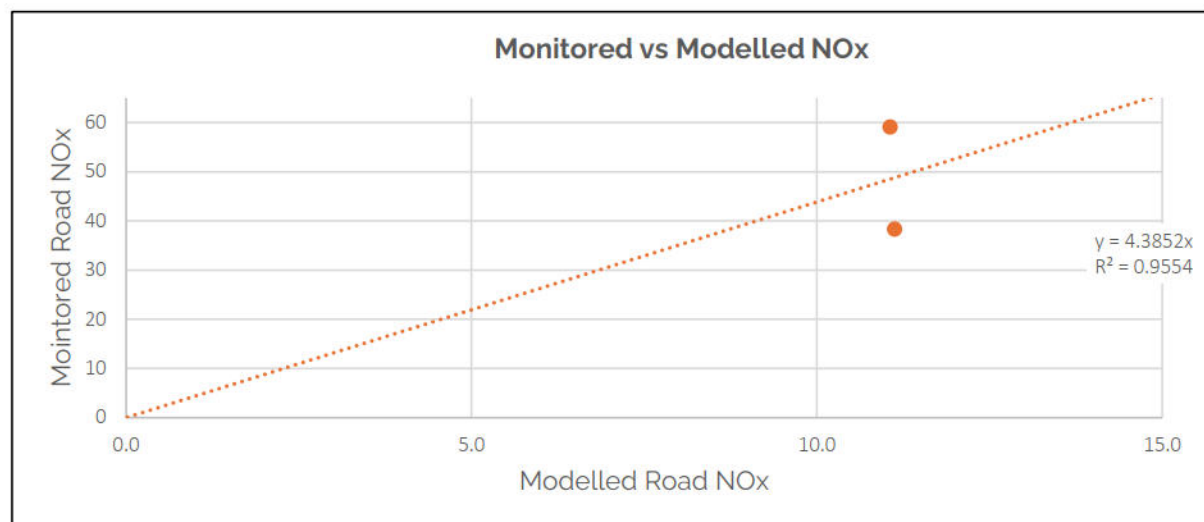


Figure 8-3: Comparison of Modelled Road-NO_x with Measured Road NO_x

The overall pre-adjusted uncertainty (RMSE) for annual mean NO₂ was 39.2% and equates to 15.7µg/m³.

Table 8-12 shows total monitored versus modelled NO₂ following the adjustment of the road contribution of NO_x by this factor.

Table 8-12: Post-adjusted 2024 Modelled and Monitored Results

Monitoring ID	Adjusted Modelled NO ₂ (µg/m ³)	Monitored NO ₂ (µg/m ³)	Difference (%)
21	27.35	23.5	16.4
22	26.27	29.9	-12.1

Following adjustment of NO_x, all modelled concentrations of NO₂ were within the range of +/- 20% of monitored concentrations:

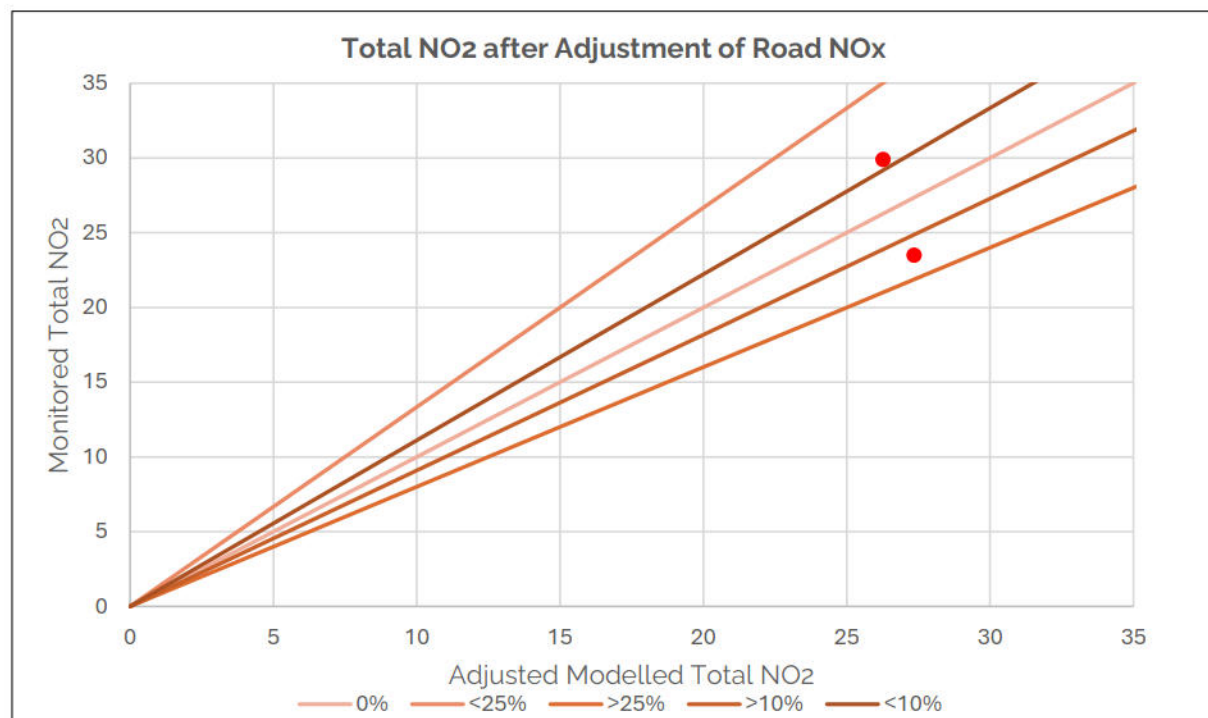


Figure 8-4: Comparison of Modelled and Monitored NO₂

In addition, the overall post-adjusted uncertainty (RMSE) for annual mean NO₂ was 9.4%, which is within the ideal range of uncertainty, and equates to 3.7µg/m³. As such, the adjustment factor is considered to be a conservative.

The above factor was also applied to concentrations of PM₁₀ and PM_{2.5}.

Appendix C: Construction Dust Mitigation

IAQM guidance provides potential mitigation measures to reduce impacts because of fugitive dust emissions during the construction phase. These have been adapted for the Site as summarised in Table 8-14.

These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the Local Authority, for example by planning condition. An example draft planning condition is presented after the table below:

Table 8-13: Fugitive Dust Emission Mitigation Measures

Issue / Control Measure	Site Risk
	High
H = Highly Recommended D = Desirable	
General	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	H
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.	H
Display the head or regional office contact information.	H
Develop and implement a DMP, which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the committed measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM ₁₀ continuous monitoring and/or visual inspections.	H
Site Management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H
Make the complaints log available to the Local Authority when asked.	H
Record any exceptional incidents that cause dust and/or air emissions, either on- or off site, and the action taken to resolve the situation in the logbook.	H

Issue / Control Measure	Site Risk
	High
H = Highly Recommended D = Desirable	
Monitoring	
Undertake daily onsite and offsite inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars, and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.	H
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and inspect log available to the Local Authority when asked.	H
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.	H
Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least 3 months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks, and construction.	H
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.	H
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	H
Avoid site runoff of water or mud.	H
Keep site fencing, barriers and scaffolding clean using wet methods.	H
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	H
Cover, seed, or fence stockpiles to prevent wind whipping.	H
Operating Vehicle/Machinery and Sustainable Travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H

Issue / Control Measure	Site Risk
	High
H = Highly Recommended D = Desirable	
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	H
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).	H
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials	H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	H
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.	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
Use enclosed chutes and conveyors and covered skips.	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
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.	H
Waste Management	
Avoid bonfires and burning of waste materials.	H
Measures Specific to Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	H
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	H
Only remove the cover in small areas during work and not all at once.	H
Measures Specific to Construction	

Issue / Control Measure	Site Risk
	High
H = Highly Recommended D = Desirable	
Avoid scabbling (roughening of concrete surfaces) if possible	H
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	H
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	H
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	D
Measures Specific to Trackout	
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use	H
Avoid dry sweeping of large areas	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport	H
Inspect on site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable	H
Record all inspections of haul routes and any subsequent action in a site log book.	H
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowzers and regularly cleaned	H
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)	H
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	H
Access gates to be located at least 10 m from receptors where possible	H

Draft condition wording:

No development shall take place until a Construction Environmental Management Plan (CEMP) has been submitted to and approved in writing by the Local Planning Authority. The CEMP shall include the Dust Management Plan required by Condition [X] and incorporate:

- *Site-specific working hours and traffic routing*
- *Phasing of construction works and site access*
- *Air quality, noise, and vibration mitigation*
- *Dust suppression measures aligned to IAQM 2024*
- *Emergency procedures and incident response*
- *Mechanisms for updating the plan*

The development shall thereafter be carried out in accordance with the approved CEMP.

Reason: *To ensure environmental and residential amenity is protected throughout the construction phase, consistent with IAQM and LAQM.TG(22) guidance.*