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Air Quality Assessment

Land North of Swindon Road, Royal Wootton
Bassett

Air Quality Assessment

Project: LAND NORTH OF SWINDON ROAD, ROYAL WOOTTON
BASSETT

Report reference: RP02-25240-R1

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REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
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1. EXECUTIVE SUMMARY

- 1.1 Cass Allen has been instructed by Gleeson Land (Gleeson) to assess the potential air quality effects associated with a proposed residential development at Land North of Swindon Road, Royal Wootton Bassett in Wiltshire. The assessment was carried out with regard to relevant local and national planning policy and guidance.
- 1.2 The site is not located within or near an Air Quality Management Area (AQMA), indicating that air quality in the vicinity is generally acceptable. Air quality at the site is primarily influenced by vehicle emissions along the A3102 Swindon Road. The M4 to the north is also likely to influence local background pollutant concentrations.
- 1.3 Potential construction phase dust soiling and particulate matter (PM: PM₁₀) health effects were assessed qualitatively, resulting in Medium and Low Risk levels being identified, respectively, in the absence of mitigation. Suitable best practice mitigation measures have been recommended, and no significant residual air quality impacts are expected.
- 1.4 A detailed atmospheric dispersion model was utilised to predict nitrogen dioxide (NO₂) and PM (PM₁₀ and PM_{2.5}) concentrations at relevant sensitive receptor locations within the study area during the operation of the development. The results indicate that pollutant concentrations at these locations will be below the relevant Air Quality Objectives (AQOs) during the operational phase, with no requirement for additional mitigation.
- 1.5 Furthermore, no significant impacts on local air quality as a result of development-generated traffic are anticipated. Accordingly, the overall effect of the development is considered 'not significant' with regard to air quality.
- 1.6 In summary, it is our view that the site is suitable for the development in terms of air quality and that there are no air quality constraints with respect to planning consent.

2. INTRODUCTION

- 2.1 Cass Allen has been instructed by Gleeson Land (Gleeson) to assess the potential air quality effects associated with a proposed residential development at Land North of Swindon Road, Royal Wootton Bassett in Wiltshire. The assessment has been carried out with regard to relevant local and national planning policy and guidance.
- 2.2 The aim of the assessment is to consider air quality conditions, and their potential to influence the development in terms of its design, scale and layout, taking into account the following aspects:
- Dust and PM emissions generated by construction phase activities;
 - Exhaust emissions from construction plant and traffic;
 - The exposure of new sensitive receptors to elevated pollutant concentrations; and
 - Emissions from traffic generated by the operation of the development.
- 2.3 Subsequently, where required, appropriate measures are identified to minimise the impacts.
- 2.4 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

3. PROJECT DESCRIPTION AND SITE CONTEXT

- 3.1 The proposal is to develop the site for up to 135 dwellings.
- 3.2 The site is not located within or near an AQMA, indicating that air quality in the vicinity is generally acceptable. The site is currently vacant and is located on the northeastern edge of Royal Wootton Bassett, bounded to the south by the A3102 Swindon Road which has the potential to contribute to pollutant concentrations at the site. To the west and south is a residential area which has the potential to be affected by emissions associated with both the construction and operational phases of the development. To the north and east of the site are open fields and woodland. The M4 to the north is also likely to influence local background pollutant concentrations.
- 3.3 The site location is shown in Figure 1.

Figure 1 Site Location and Surrounding Area



4. LEGISLATION AND PLANNING POLICY

Air Quality Legislation

- 4.1 The wider air quality legislation underpinning national, regional and local planning policy, is summarised in Appendix 1.
- 4.2 The National AQOs and Air Quality Standards Regulations limit and target values for the UK are summarised in the Air Quality Strategy. These limits, for ten key air pollutants, are based on both European Union directives and World Health Organization (WHO) guidelines. They are periodically updated, informed by the latest scientific evidence, to protect public health, vegetation and ecosystems. The Local Air Quality Management (LAQM) regime requires local authorities to regularly evaluate the air quality in their areas based on these AQOs.
- 4.3 As a regional pollutant, many sources of PM_{2.5} are beyond local authority control therefore, it does not form part of the LAQM regime. However, long-term (2040) targets for ambient PM_{2.5} concentrations are set in 'The Environmental Targets (Fine Particulate Matter) (England) Regulations' (2023), and an interim (2028) target is published in the 'Environmental Improvement Plan' (2023). PM_{2.5} is a key air pollutant for health impacts, and local authorities must monitor progress towards meeting these reduced levels.
- 4.4 The National AQOs for the pollutants most associated with vehicle emissions, and therefore applicable to this assessment, are detailed in Table 1.

Table 1 UK National Air Quality Objectives

Pollutant	Objective	Averaging Period
Nitrogen Dioxide (NO ₂)	40µg/m ³	Annual mean
	200µg/m ³ not to be exceeded more than 18 times per year	1-hour mean
Particulate Matter (PM ₁₀)	40µg/m ³	Annual mean
	50µg/m ³ not to be exceeded more than 35 times per year	24-hour mean
Particulate Matter (PM _{2.5})	20µg/m ³	Annual mean

- 4.5 The above AQOs are typically applied where there is 'relevant exposure', i.e. where members of the public are likely to be present for the relevant averaging periods, or regularly exposed, and not in workplaces where relevant provisions concerning health and safety at work apply.

National Policy

- 4.6 Outline guidance for the assessment of air quality affecting new developments is given in the 'National Planning Policy Framework' (NPPF) (December 2024; as amended February 2025). Relevant sections in this case are included in Appendix 1.

Local Policy

4.7 The Wiltshire Council (WC) planning policy relevant to air quality is summarised in Appendix 1.

4.8 To address the requirements of the national and local policies, the following key air quality matters have been considered:

- Construction phase fugitive emissions of dust and PM impacts at existing receptors;
- Construction phase plant and vehicle emissions impacts at existing receptors;
- Operational phase vehicle emissions exposure at proposed receptors; and
- Operational phase vehicle emissions impacts at existing receptors.

5. ASSESSMENT METHODOLOGY

- 5.1 The scope and methodology for this assessment have been determined with regard to:
- Defra 'LAQM Technical Guidance' (May 2025) (LAQM.TG22); and
 - Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM), 'Land Use Planning & Development Control: Planning for Air Quality' (January 2017) (LUPDC).

- 5.2 Reference has also been made to other relevant technical guidance, where applicable.

Construction Phase

- 5.3 The assessment of potential air quality impacts during the construction phase has focused on the generation and dispersion of dust and PM₁₀, following the IAQM 'Guidance on the Assessment of Dust from Demolition and Construction' (January 2024) methodology, summarised as follows:
- Step 1 – screen the need for an assessment: consider impacts to sensitive human and ecological receptors within 250m or 50m of the site boundary, respectively (indicated on Figure 2), and within 50m of a route used by construction vehicles up to 250m from the site entrance.
 - Step 2A – estimate the dust emission magnitude for each of the main construction activities – demolition, earthworks, general construction, and trackout.
 - Step 2B – determine the sensitivity of the receiving environment, through consideration of factors such as meteorological conditions, the number of nearby receptors, their proximity and their sensitivity. Other factors to consider are detailed in Box 9 of the guidance. A wind rose for nearby Fairford weather station is included in Appendix 2.
 - Step 2C – define the risk of impacts.
 - Step 3 – identify site-specific mitigation requirements (in addition to basic project controls).
- 5.4 In addition, exhaust emissions from construction vehicles and plant may impact local air quality. The potential for significant effects resulting from these emissions has also been considered with reference to screening and significance criteria in LUPDC.
- 5.5 A review of the Multi-Agency Geographic Information for the Countryside (MAGIC) website did not identify any statutory designated ecological sites within the relevant screening distances, and therefore these have been excluded from the construction phase assessment.

Operational Phase

- 5.6 Concentrations of NO₂, PM₁₀ and PM_{2.5} have been considered in the operational phase assessment as road traffic is a major source of these pollutants and their concentrations are often close to, or in exceedance of, the relevant AQOs in urban locations.

Air Quality Impacts

- 5.7 The LUPDC guidance indicates the magnitude of change in traffic flows that is potentially significant, and therefore likely to require further assessment, as follows:
- 5.8 For locations distant from an AQMA:
- Light Duty Vehicle (LDV) flows of >500 Annual Average Daily Traffic (AADT); and/or
 - Heavy Duty Vehicle (HDV) flows of >100 AADT.
- 5.9 These criteria were, therefore, used to inform the study area, in liaison with the project's Transport Consultant (Pegasus).

Site Suitability

- 5.10 The development also has the potential to expose future users to elevated pollutant concentrations.

Modelled Receptors

- 5.11 Cambridge Environmental Research Consultants' (CERC) ADMS-Roads (version 5.1.0.2) atmospheric dispersion model has been used to predict pollutant concentrations both without and with the development in place at existing sensitive receptor (R) locations and with the development in place at proposed receptor (PR) locations along the site boundary, as detailed in Table 2.

Table 2 Modelled Receptor Locations

ID	Description	Grid Reference (OSGB)	Height (m)*
R1	'Ryelands', Swindon Road	408040.8, 183111.4	1.5
R2	Willow Barn', Swindon Road	407926.0, 183232.3	
R3	53 Swindon Road	407821.3, 183312.1	
R4	51 Swindon Road	407754.3, 183398.2	
R5	1 Arnold Court, Swindon Road	407622.8, 183493.8	
R6	6 Elm Close	407419.7, 183546.8	
PR1	Southern site boundary along A3102	407973.7, 183183.6	
PR2		408048.9, 183140.4	
PR3		408141.2, 183099.4	
PR4		408155.6, 183093.6	
PR5		408221.4, 183064.3	

* To represent the average adult breathing zone above floor level and to align with Defra national background modelling used within this assessment.

- 5.12 A review of the MAGIC website did not identify any statutory designated ecological sites in the vicinity of significantly affected roads, and therefore these have been excluded.

- 5.13 To assess the site suitability and local air quality effects of the development, the following scenarios have been modelled:
- 2023 – Model Verification;
 - 2028 – Anticipated Opening Year, Without Development; and
 - 2028 – Anticipated Opening Year, With Development.
- 5.14 The study area, including modelled road links, monitoring and verification locations and receptors, is shown in Figure 2 and Figure 3 below.
- 5.15 Details of the traffic data used in the model are included in Appendix 3, and other model inputs such as emission factors, verification and adjustment, in Appendix 4.

PM_{2.5} Targets

- 5.16 Additionally, Defra's 'PM_{2.5} Targets: Interim Planning Guidance' (October 2024), prompts developers to consider:
1. *How has exposure to PM_{2.5} been considered when selecting the development site?*
 2. *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} and its precursors?*
- 5.17 Accordingly, these aspects are also considered in the operational phase assessment.

Significance Criteria

- 5.18 Significance criteria applicable to the assessment of vehicle emissions impacts have been derived from LUPDC. Where the 'without' and 'with' development pollutant concentrations are predicted at an individual receptor, the guidance recommends expressing the magnitude of incremental change as a proportion of the Air Quality Assessment Level (normally the applicable AQO).
- 5.19 The LUPDC significance criteria applicable to the assessment of impacts at existing receptors are included in Appendix 5. It should be noted that, in line with LUPDC, *'the criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement... the objective is to identify situations where there is a possibility of a significant effect on local air quality.'*
- 5.20 For proposed receptors, predicted pollutant concentrations have been compared to the relevant AQOs to determine the potential for exceedance, and therefore, the suitability of the site for the proposed use.

6. BASELINE CONDITIONS

- 6.1 WC does not undertake air quality monitoring within or nearby the study area. As such, the closest collected data are in the tables below and were obtained from Swindon Borough Council (SBC) and Defra to provide a baseline for consideration. Monitoring locations are indicated on Figure 3.

Table 3 SBC Monitored Concentrations Across Study Area – NO₂

ID	Location	Type	Distance to site (km)	Monitored Annual Mean (µg/m ³)				
				2019	2020	2021	2022	2023
S3	S4, 8 Okus Rd	Roadside	>6.0	17.8	14.1	15.3	14.9	13.3
S4	186 Kingshill Rd			30.5	23.8	25.6	27.1	22.2
S6	Swindon 8, 102 Bath Rd			32.4	28.1	29.4	26.0	23.3
S7	No. 81 Kingshill Rd			44.8	38.3	40.5	36.5	31.9
S11	Kingshill Rd/Clifton St			39.3	32.4	35.1	33.0	30.8
S12	Westcott Place			28.1	22.9	25.0	24.6	22.7
S15	102 Kingshill Rd			46.7	40.6	45.0	42.2	38.7
S16	86 Clifton Rd			25.8	21.1	21.7	21.9	21.7
S18	63 Kingshill Rd			29.5	24.4	26.7	25.2	22.1
S19	No. 85 Kingshill Rd			38.5	32.7	33.1	35.9	33.0
S26-28	Bath Rd Car Park			21.2	16.0	16.5	16.8	15.0
S29	Opp 101 Kingshill Rd			60.1	51.8	53.1	56.0	55.4
S30	Corner Kingshill/Clifton St			75.9	62.2	67.0	69.4	56.9

Note: **Bold** denotes exceedance of the AQO. Data obtained from SBC 2024 Air Quality Annual Status Report (ASR) (2024). 2020 / 2021 results are likely to be atypical due to COVID-19 travel restrictions.

- 6.2 As indicated in Table 3 above, the closest monitored pollutant concentrations to the site were largely below the relevant AQO in the most recent monitoring year, 2023, with the exception of S29 and S30. However, all of these diffusion tubes are located over 6km from the site, in an urban area along a busy road, part of which is designated Kingshill Road, Swindon AQMA, declared due to exceedances of annual mean NO₂ concentrations. Therefore, detailed dispersion modelling has been undertaken to more accurately predict future concentrations at the site.

Table 4 Mapped Background Annual Mean Concentrations Across Study Area (µg/m³)

2023				2028			
NO _x	NO ₂	PM ₁₀	PM _{2.5}	NO _x	NO ₂	PM ₁₀	PM _{2.5}
11.8 - 12.7	9.1 - 9.8	12.7 - 12.9	7.8 - 7.9	7.3	5.8	12.5 - 12.8	6.6 - 6.8

Note: Data obtained from <https://uk-air.defra.gov.uk/data/lagm-background-home>. A range is given, where appropriate, as the study area spans multiple grid squares.

- 6.3 No monitoring of PM₁₀ or PM_{2.5} is undertaken in the vicinity of the site. However, Defra-predicted background concentrations for 2023 and 2028 are 'well below' (defined by the IAQM as less than 75% of) the relevant AQOs. These background concentrations are later combined with roadside modelling results to provide total 'predicted environmental concentrations' at receptor locations.

7. CONSTRUCTION PHASE ASSESSMENT

- 7.1 The IAQM methodology has been used to assess the potential impact of dust and PM₁₀ arising from on-site activities. As indicated within the guidance, the use of professional judgment is necessary, due to the diverse range of projects that are subject to dust impact assessment, meaning that it is not possible to be prescriptive as to how to assess the impacts.
- 7.2 As sensitive receptors were identified within the relevant IAQM screening distances, the assessment progressed to Step 2, which has been summarised in the tables below.

Table 5 Step 2A – Dust Emission Magnitude for Construction Activities

Activity	Magnitude	Explanation
Demolition	Small	Nominal demolition of existing structures - total building volume <12,000m ³ .
Earthworks	Medium	Total site area 18,000m ² -110,000m ² , moderately dusty soil type (loamy and clayey), 5-10 heavy earth-moving vehicles active at any one time.
Construction	Medium	Total building volume 12,000m ³ -75,000m ³ .
Trackout	Medium	20-50 outward HDV movements per day, >100m unpaved road length likely.

Table 6 Step 2B – Sensitivity of the Area

Potential Impact	Details	Construction Activity			
		Demolition	Earthworks	Construction	Trackout
Dust Soiling: Amenity	1-10 High sensitivity receptors within 20m of site	Medium	Medium	Medium	Medium
PM ₁₀ : Health	As above and low background PM ₁₀ concentration	Low	Low	Low	Low

Table 7 Step 2C – Summary of Impact Risks to Define Site-Specific Mitigation

Potential Impact	Construction Activity			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low	Medium	Medium	Medium
Human Health	Negligible	Low	Low	Low

- 7.3 It should be noted that the prevailing winds (as shown in Appendix 2) are south-westerly and thus, locations to the north-east, downwind of the site, are most at risk of construction dust impacts. As a robust case, the development is considered Medium Risk for dust soiling effects and Low Risk for PM₁₀ health effects, in the absence of mitigation. Following implementation of the recommended mitigation measures for the relevant activities' risk levels in Appendix 6, it is anticipated that the residual effect of the construction phase will be not significant.
- 7.4 With regard to construction traffic, the construction phase flows are not expected to exceed the criteria detailed in paragraph 5.8 and therefore, significant residual effects are not anticipated.

8. OPERATIONAL PHASE ASSESSMENT – SITE SUITABILITY

- 8.1 To consider the suitability of the site for the proposed use, the potential for future occupants of the development to be exposed to exceedances of the relevant AQOs has been assessed. Modelled predicted pollutant concentrations at proposed receptors are detailed in Table 8.

Table 8 Predicted Pollutant Concentrations at the Development in 2028

Receptor	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)					
	NO ₂	% of AQO (40 $\mu\text{g}/\text{m}^3$)	PM ₁₀	% of AQO (40 $\mu\text{g}/\text{m}^3$)	PM _{2.5}	% of AQO (20 $\mu\text{g}/\text{m}^3$)
PR1	19.0	47.4	17.1	42.6	9.2	45.9
PR2	21.5	53.7	18.0	44.9	9.3	46.7
PR3	22.2	55.4	18.2	45.4	9.5	47.3
PR4	21.4	53.6	17.9	44.8	9.3	46.6
PR5	18.9	47.2	17.0	42.5	8.9	44.3

Note: Results are reported to the nearest 0.1 $\mu\text{g}/\text{m}^3$. Any apparent discrepancies are due to rounding.

- 8.2 The data in Table 8 show that pollutant concentrations were predicted to be below the relevant annual mean AQOs at all proposed receptor locations. The highest predicted NO₂, PM₁₀ and PM_{2.5} concentrations were 22.2 $\mu\text{g}/\text{m}^3$, 18.2 $\mu\text{g}/\text{m}^3$, and 9.5 $\mu\text{g}/\text{m}^3$ respectively, at receptor PR3.
- 8.3 The annual mean NO₂ concentrations predicted by the model were all below 60 $\mu\text{g}/\text{m}^3$. As indicated in LAQM.TG22, a breach of the hourly mean AQO for NO₂ is unlikely where this is the case. Equally, exceedances of the 24-hour mean AQO for PM₁₀ are not anticipated, as all predicted annual mean concentrations fall below the 32 $\mu\text{g}/\text{m}^3$ proxy value.
- 8.4 Accordingly, it is not anticipated that proposed receptors would be exposed to exceedances of the relevant AQOs; therefore, the site is considered suitable for the proposed use, with no requirement for additional mitigation.
- 8.5 In addition to the above, Defra guidance now requires consideration of how a development will reduce exposure to PM_{2.5}. In terms of selecting this development site, which is in an area where PM_{2.5} concentrations are expected to be well below the AQO and where there is no requirement to reduce exposure further, exposure to PM_{2.5} has been considered.

9. OPERATIONAL PHASE ASSESSMENT – AIR QUALITY IMPACTS

- 9.1 To assess the potential air quality impacts resulting from operational phase development-generated vehicle emissions at existing receptor locations, dispersion modelling has been undertaken to quantify pollutant concentrations in both ‘without development’ and ‘with development’ scenarios. A summary of the worst-case impacts is provided in Table 9, with full model results detailed in Appendix 7.

Table 9 Worst-Case Predicted Operational Impacts at Existing Receptors in 2028

Pollutant	Receptor	Annual Mean Concentration (µg/m³)			Change (% AQO)	Impact Descriptor
		AQO	Without	With		
Highest Absolute Concentrations						
NO₂	R1	40	17.3	17.6	0.9	Negligible
PM₁₀	R4	40	17.5	17.6	0.3	Negligible
PM₂.₅	R4	20	9.4	9.5	0.3	Negligible
Maximum Predicted Changes						
NO₂	R1	40	17.3	17.6	0.9	Negligible
PM₁₀	R1	40	16.5	16.6	0.3	Negligible
PM₂.₅	R1	20	8.6	8.6	0.4	Negligible

Note: Results are reported to the nearest 0.1 $\mu\text{g}/\text{m}^3$. Any apparent discrepancies are due to rounding.

- 9.2 No existing receptors are expected to experience pollutant concentrations in excess of the relevant annual mean AQOs. Furthermore, the impact at all receptor locations is considered ‘Negligible’ in accordance with LUPDC.
- 9.3 As such, based on the extent of predicted population exposure to NO₂, PM₁₀ and PM_{2.5} impacts, the overall effect of the development is considered ‘not significant’ with regard to air quality.
- 9.4 In addition to the above, Defra guidance now requires consideration of how a development will reduce emissions of PM_{2.5}. The development will include a Travel Plan intended to encourage the transition to more sustainable forms of transport, with lower emissions of PM_{2.5} and other pollutants. Additionally, by providing on site amenity areas such as a play area and pedestrian linkages, the development will minimise the requirement for private car trips.

10. CONCLUSIONS

- 10.1 Cass Allen was instructed by Gleeson Land (Gleeson) to assess the potential air quality effects associated with a proposed residential development at Land North of Swindon Road, Royal Wootton Bassett in Wiltshire. The assessment was carried out with regard to relevant local and national planning policy and guidance.
- 10.2 Potential construction phase dust soiling and PM₁₀ health effects were assessed qualitatively, resulting in Medium and Low Risk levels being identified, respectively, in the absence of mitigation. Suitable best practice mitigation measures have been recommended, and no significant residual air quality impacts are expected.
- 10.3 A detailed atmospheric dispersion model was utilised to predict NO₂, PM₁₀ and PM_{2.5} concentrations at relevant sensitive receptor locations within the study area during operational phase. The results indicate that pollutant concentrations at existing and proposed sensitive receptors will be below the relevant AQOs during the operational phase.
- 10.4 Furthermore, no significant impacts on local air quality as a result of development-generated traffic are anticipated. Based on the extent of predicted population exposure to NO₂, PM₁₀ and PM_{2.5} impacts, the overall effect of the development is considered to be 'not significant', with regard to air quality, with no requirement for additional mitigation.
- 10.5 In summary, it is our view that the site is suitable for the development in terms of air quality and that there are no air quality constraints with respect to planning consent.

Appendix 1 Air Quality Legislation and Policy

Legislation

Defra and the Devolved Administrations (2007) - The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2):

The Air Quality Strategy provides a framework for reducing air pollution in the UK, with the aim of meeting the requirements of European Union (EU) legislation. This has been brought into UK law via the EU (Withdrawal) Act 2018 (as amended) and is referred to as 'retained EU law'.

The air quality standards set within the Air Quality Strategy are recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO), based on current scientific knowledge regarding the effects of each pollutant on health and the environment.

The AQOs are medium-term policy-based targets set by the government, taking into account economic efficiency, practicability, feasibility and timescales. Whilst some of the AQOs correspond with the EPAQS / WHO limits, others have a margin of tolerance, by specifying a number of permitted exceedances of the standard over a given period.

Many of the AQOs in the Air Quality Strategy have been made statutory in England via The Air Quality (England) Regulations, 2000, The Air Quality (England) Amendment Regulations, 2002 and The Air Quality Standards (Amendment) Regulations, 2016 – Statutory Instrument 2016 No. 1184.

Environmental Protection Act (1990):

Section 79 of the Environmental Protection Act 1990 defines statutory nuisance relevant to dust and particles as:

'Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance'; and

'Any accumulation or deposit which is prejudicial to health or a nuisance'.

Furthermore, Section 80 states that where a statutory nuisance is shown to exist, the Local Authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the Local Authority may abate the nuisance and recover expenses. However, there are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist and nuisance is a subjective concept, its perception being highly dependent upon the existing conditions and the change which has occurred.

Environment Act (2021):

The Act mandates that local authorities review and document local air quality within their jurisdiction by way of staged appraisals and respond accordingly, with the aim of meeting the AQOs defined in the Regulations. There is a requirement for local authorities to identify relevant sources of emissions that are likely to be responsible for any failure to achieve the AQOs, or to identify relevant sources within neighbouring authorities' areas. Where the objective(s) are not likely to be achieved within the relevant period(s), the authority is required to designate an AQMA. For each AQMA the Local Authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality, in order to work towards achieving air quality standards in the future.

Defra (2019) Clean Air Strategy:

The UK Government's Clean Air Strategy sets out the comprehensive actions required to improve air quality, required from all parts of government and society.

The primary focus of previous iterations of the Clean Air Strategy has been NO₂, and its principal source – road traffic. The 2019 Strategy broadens the focus into other areas, including actions on clean growth and pollutant emissions from other sources such as industry, agriculture, and domestic wood-burning stoves.

Policy

National

NPPF sections relevant to air quality are stated below for planning policy context:

110. ...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.

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 ... air ... pollution. Development should, wherever possible, help to improve local environmental conditions such as air ... quality.

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.

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.

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

Local

The Wiltshire Core Strategy (adopted January 2015) outlines the strategic planning policy for Wiltshire and contains the following relevant to this assessment:

Core Policy 55

Air quality

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.*

Core Policy 57

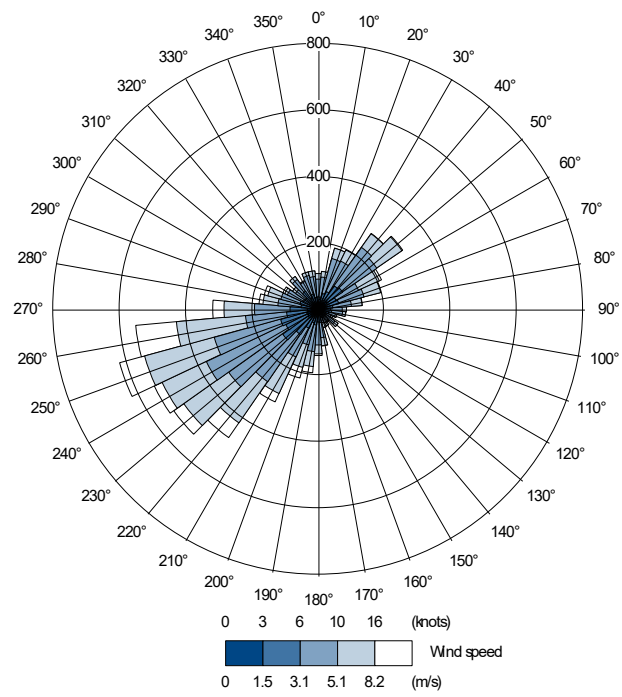
Ensuring high quality design and place shaping

A high standard of design is required in all new developments... Development is expected to create a strong sense of place through drawing on the local context and being complementary to the locality. Applications for new development must be accompanied by appropriate information to demonstrate how the proposal will make a positive contribution to the character of Wiltshire through:

...

- vii having regard to the compatibility of adjoining buildings and uses, the impact on the amenities of existing occupants, and ensuring that appropriate levels of amenity are achievable within the development itself, including the consideration of ... pollution (e.g. ... smoke, fumes, ...).

Appendix 2 Wind Rose for Fairford (2023)



Appendix 3 Traffic Data

Traffic data for the dispersion model were obtained from Pegasus and supplemented by additional data from Department for Transport (DfT) Traffic Counts. Where necessary, traffic data were converted to the appropriate assessment years using a robust factor derived from Defra Trip End Model Presentation Program (TEMPro) (version 8.1).

Model Verification Road Link Details

Link ID	Description	Road Type	Speed (km/h)
1	A4289 Kingshill Road, east of the B4289 Westcott Place, west of Dunsford Close	Urban (not London)	5
2	A4289 Kingshill Road, east of Dunsford Close, west of William Street/Erin Court		5
3	A4289 Kingshill Road, east of William Street/Erin Court, west of 1 Kingshill Rd		5
4	A4289 Kingshill Road, east of 1 Kingshill Rd, west of Exmouth Street		20
5	A4289 Kingshill Road, east of Exmouth Street, west of Clifton Street		20
6	A4289 Kingshill Road, east of Clifton Street, west of Okus Road roundabout		5
7	A4289 Kingshill Road, east of Okus Road roundabout, west of Kent Road/ Goddard Avenue		5
8	A4289 Kingshill Road, east of Kent Road/ Goddard Avenue, west of Quarry Road		30
9	A4289 Kingshill Road, east of Quarry Road, west of Eastcott Road		5
10	A4289 Kingshill Road, east of Eastcott Road, west of pedestrian crossing		5
11	A4289 Kingshill Road, east of pedestrian crossing, west of Prospect Place		20
12	A4289 Kingshill Road, east of Prospect Place, west of Victoria Road		5

Model Verification 2023 Traffic Data

Link ID	AADT	%HDV
1	15,570	0.93
2	15,570	0.93
3	15,570	0.93
4	15,570	0.93
5	15,570	0.93
6	15,570	0.93
7	15,570	0.93
8	15,570	0.93
9	15,570	0.93
10	15,570	0.93
11	15,570	0.93
12	15,570	0.93

Operational Phase Road Link Details

Link ID	Description	Road Type	Speed (km/h)
1	Site access road	Urban (not London)	10
2	A3102 Swindon Road, east of site access, junction approach/exit		10
3	A3102 Swindon Road		80
4	A3102 Swindon Road, roundabout approach/exit		80
5	A3102 Swindon Road, west of site access, east of Stoneover Lane, junction approach/exit		10
6	A3102 Swindon Road, west of Stoneover Lane		10
7	A3102 Swindon Road		45
8	A3102 Swindon Road, roundabout approach/exit		10
9	Stoneover Lane, south of A3102 Swindon Road, north of Marlowe Way, junction approach/exit		10
10	Stoneover Lane, south of Marlowe Way, north of Longleaze		30
11	A3102/B4042 roundabout		15
12	A3102 High Street, south of roundabout, north of Coped Hall Business Park		10
13	A3102 High Street, south of Coped Hall Business Park		45

Operational Phase Traffic Data

Link ID	2028 Without Development		2028 With Development	
	AADT	%HDV	AADT	%HDV
1	-	0.00	1,078	0.00
2	19,125	3.01	19,388	2.97
3	19,125	3.01	19,388	2.97
4	19,125	3.01	19,388	2.97
5	18,647	3.11	19,462	3.11
6	18,647	3.11	19,190	3.03
7	18,647	3.11	19,190	3.03
8	9,324	3.11	9,595	3.03
9	7,047	2.28	7,318	2.20
10	7,047	2.28	7,318	2.20
11	15,136	3.30	15,366	3.20
12	13,943	4.05	14,393	3.88
13	13,943	4.05	14,393	3.88

Appendix 4 Dispersion Model Details

Model Details and Input Parameters

Parameter	Value
Emissions Factors	Defra Emissions Factors Toolkit v13.1 using the traffic data in Appendix 3
Emissions Year	2023 for verification, 2028 for future scenarios
Background Concentrations	Defra 2021 background maps – 2023 for verification, 2028 for future scenarios
Surface Roughness	Verification: Site – 1.0m; Meteorological Station – 0.2m Operational: Site – 0.5m; Meteorological Station – 0.2m
Monin-Obukhov Length	Verification: Site – 30m; Meteorological Station – 10m Operational: Site – 10m; Meteorological Station – 10m
Meteorological Data	Hourly sequential, Fairford (2023)
Road-contribution Adjustment Factor	2.66 – see Model Verification, below
NO _x to NO ₂ conversion	Defra NO _x to NO ₂ Calculator v9.1 and Defra-mapped background concentrations
Street Canyon	Model Verification Link 6: height – 9.5m, width – 9.5m
Gradient	Not applicable to this study area

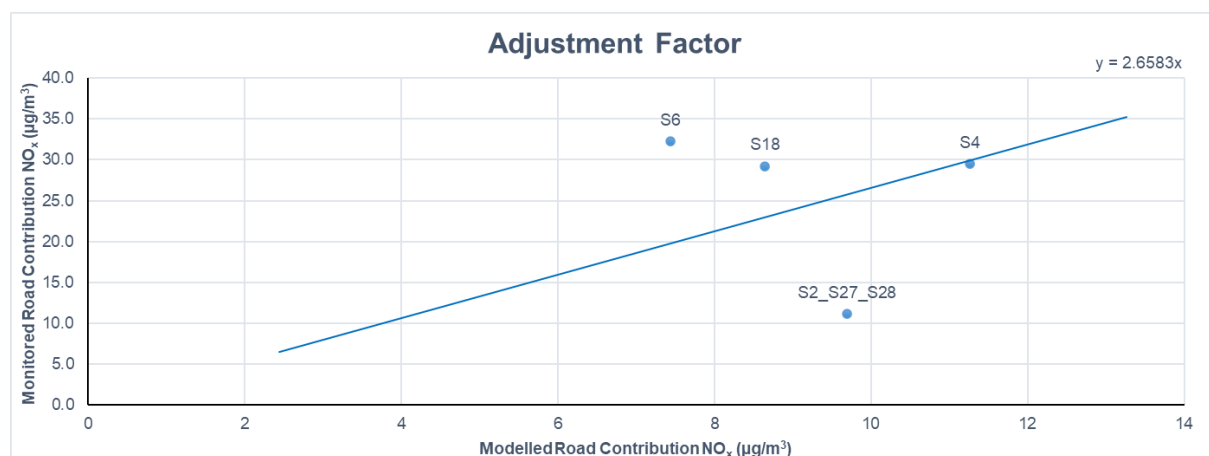
Model Verification

The model has been verified using the LAQM.TG22 methodology. The model has been used to predict 2023 annual mean road-NO_x contributions at the closest suitable monitoring locations to the study area. The modelled road-NO_x concentrations have been compared with the 'measured' road-NO_x utilising the Defra NO_x to NO₂ Calculator. Due to the lack of local PM monitoring data, the adjustment factor for NO₂ was also utilised for PM₁₀ and PM_{2.5}, following the LAQM.TG22 methodology.

Model Verification (all concentrations in µg/m³)

Monitor ID	Monitored NO ₂	Background NO ₂	Monitored Road NO _x	Modelled Road NO _x	Ratio
S4	22.2	9.1	29.5	11.3	2.619
S6	23.3	9.1	32.3	7.4	4.338
S18	22.1	9.1	29.3	8.6	3.383
S2, S27, S28	15.0	9.8	11.1	9.7	1.146

Comparison of Measured Road-NO_x with Modelled Road NO_x



Calculation of Model Uncertainty

To assess model uncertainty, the Root Mean Square Error (RMSE) of the above data was calculated to provide an estimate of the average error of the model. The overall weighted RMSE value calculated following model verification was 4.25µg/m³ (10.61%), which is within the acceptable range specified in LAQM.TG22.

Appendix 5 Operational Phase Significance Criteria

Long Term Average Concentration at Receptors in Assessment Year	% Change in Concentration Relative to Air Quality Objective (AQO)			
	1	2 – 5	6 – 10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

Notes:

- The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as Negligible.
- The Table is only designed to be used with annual mean concentrations.
- Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
- When defining the concentration as a percentage of the AQO, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme' concentration for an increase.
- The total concentration categories reflect the degree of potential harm by reference to the AQO value. At exposure less than 75% of this value, i.e. 'well below', the degree of harm is likely to be small. As the exposure approaches and exceeds the AQO, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQO.
- It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQO. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQO, rather than being exactly equal to it.
- When defining the concentration as a percentage of the AQO, 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme;' concentration where there is an increase. Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.
- LUPDC states that an assessment must reach a conclusion on the likely significance of the predicted effect. It should be noted that this is a binary judgement of either it is significant, or it is not significant.

Appendix 6 Recommended Construction Phase Mitigation

Recommended Mitigation Measures for Medium-Risk Sites

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences onsite.
- 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, where applicable.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this Appendix. Further, 'desirable' measures from IAQM guidance should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM₁₀ continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
- Make complaints log available to the Local Authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on or offsite should be recorded, and the action taken to resolve the situation, in the logbook.

Monitoring

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

Preparing and Maintaining the Site

- Plan the 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 onsite.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being reused onsite. If they are being reused onsite cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicle operators 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.

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 is available on the site for effective dust/PM suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes/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 onsite 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.

Measures Specific to Demolition (Low Risk)

- 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.

Measures Specific to Construction (Medium Risk)

- 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 make sure that that appropriate additional control measures are in place.

Measures Specific to Trackout (Medium Risk)

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect onsite haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site logbook.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water 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 10m from receptors, where possible.

Appendix 7 Dispersion Model Results

Annual Mean NO₂ Impacts

Receptor	Without (µg/m ³)	With (µg/m ³)	With % of AQO	Change (µg/m ³)	Change (% AQO)	Impact Descriptor
R1	17.3	17.6	44.0	0.4	0.9	Negligible
R2	12.2	12.3	30.8	0.2	0.4	Negligible
R3	13.1	13.3	33.1	0.2	0.4	Negligible
R4	15.1	15.3	38.4	0.2	0.6	Negligible
R5	10.4	10.5	26.2	0.1	0.3	Negligible
R6	12.8	12.9	32.3	0.1	0.4	Negligible

Note: Results are reported to the nearest 0.1µg/m³. Any apparent discrepancies in results are due to rounding.

Annual Mean PM₁₀ Impacts

Receptor	Without (µg/m ³)	With (µg/m ³)	With % of AQO	Change (µg/m ³)	Change (% AQO)	Impact Descriptor
R1	16.5	16.6	41.5	0.1	0.3	Negligible
R2	15.7	15.8	39.4	0.1	0.2	Negligible
R3	16.3	16.4	41.1	0.1	0.2	Negligible
R4	17.5	17.6	44.0	0.1	0.3	Negligible
R5	14.7	14.7	36.8	0.1	0.1	Negligible
R6	15.0	15.0	37.6	0.1	0.2	Negligible

Note: Results are reported to the nearest 0.1µg/m³. Any apparent discrepancies in results are due to rounding.

Annual Mean PM_{2.5} Impacts

Receptor	Without (µg/m ³)	With (µg/m ³)	With % of AQO	Change (µg/m ³)	Change (% AQO)	Impact Descriptor
R1	8.6	8.6	43.2	0.1	0.4	Negligible
R2	8.4	8.5	42.4	<0.1	0.2	Negligible
R3	8.8	8.8	44.2	0.1	0.3	Negligible
R4	9.4	9.5	47.3	0.1	0.3	Negligible
R5	7.9	7.9	39.7	<0.1	0.1	Negligible
R6	8.1	8.1	40.5	<0.1	0.2	Negligible

Note: Results are reported to the nearest 0.1µg/m³. Any apparent discrepancies in results are due to rounding.



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