

Report

Former Novartis Site, Phase 3

Air Quality Mitigation Measures

For Lovell

14 August 2026

Document Control

Project Title:	Former Novartis Site, Phase 3
Project Number:	17942A-10
Client:	Lovell
Principal Contact:	Charlie Allchurch
Document Title:	Air Quality Mitigation Measures
Document Number:	17942A-10-R01-01
Prepared By:	Michelle Wan and Sam Murphy
Reviewed By:	Denise Evans

Revision History

01 14/08/2026



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3rd Floor St Augustine's Court, 1 St. Augustine's Place, Bristol, BS1 4UD Tel: +44(0)117 974 1086

First Floor, 3 – 7 Herbal Hill, London, EC1R 5EJ Tel: +44(0)20 3873 4780

First Floor, Patten House, Moulders Lane, Warrington, WA1 2BA Tel: +44(0)1925 937 195

Nile House, Nile St, Brighton and Hove, Brighton, BN1 1HW Tel: +44(0)20 3873 4780

1 Aire St, Leeds, LS1 4PR Tel: +44(0)20 3873 4780

Avenue du Port, 86c Box 204, 1000 Bruxelles Tel: +44(0)20 3873 4780

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1 Introduction

- 1.1 This report has been prepared by Air Quality Consultants Ltd | Part of Logika Group (AQC). It presents Air Quality Mitigation Measures to support the discharge of Condition 10 of the Horsham District Council (HDC) Decision Notice for the permitted development (Application No. DC/25/0415), dated 16th January 2026. The full wording of Condition 10 is as follows:

"Other than works of site survey and investigations, notwithstanding the submitted details, no development shall hereby commence until a full detailed Air Quality Mitigation Measures Report has been submitted and approved by the Local Planning Authority. The report shall outline modelling and all mitigations measures stating how the measures will be delivered. The details shall have regard to the Council's latest Air Quality & Emissions Reduction Guidance document, as well as West Sussex County Council's 'Guidance on Parking at New Developments'. The measures shall be implemented in accordance with the approved details and be retained as such thereafter.

Reason: To ensure the development provides appropriate and deliverable air quality mitigation measures in accordance with Policies 24 & 40 of the Horsham District Planning Framework (2015)."

- 1.2 The permitted development is for the residential development on land that was previously occupied by the Novartis Pharmaceuticals Research and Development facility and forms the Phase 3 area of the development of the site. The development will deliver 244 new affordable homes, Public Open Space and associated car parking.
- 1.3 In January 2025, AQC prepared an Air Quality Assessment¹ in support of the planning application for this development (hereafter referred to as the '2025 AQA'). The report included the calculation of damage costs totalling £37,078, in accordance with Sussex-air Partnership's 'Air Quality and Emissions Mitigation Guidance for Sussex' (Sussex-air, 2021).
- 1.4 This report presents the Air Quality Mitigation Measures to satisfy the requirements of Condition 10, setting out the mitigation measures to be implemented during the operation of the development to meet the damage costs, as agreed with the HDC Environmental Protection Officer, and assessing the improvement in the impacts due to the mitigation measures.
- 1.5 The report follows an agreed methodology from a consultation with the HDC Environmental Protection Officer in July 2026.
- 1.6 A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A1.

¹ Report No. J10-16178A-10-F1

2 Policy Context

- 2.1 Only policies directly relevant to Condition 10 are reviewed here, to ensure that the mitigation measures align with local policy and guidance, as stated in Condition 10:

"The details shall have regard to the Council's latest Air Quality & Emissions Reduction Guidance document, as well as West Sussex County Council's 'Guidance on Parking at New Developments'. The measures shall be implemented in accordance with the approved details and be retained as such thereafter."

- 2.2 A full review of policies relevant to air quality is presented in the 2025 AQA¹.

Local Planning Policy & Guidance

- 2.3 The Sussex Air Quality Partnership, which includes HDC, published updated 'Air Quality and Emissions Mitigation Guidance for Sussex' in 2021 (Sussex-air, 2021). This guidance requires the calculation of the air quality damage cost of a development defined as 'major', in order to:

"determine the appropriate level of mitigation required to help avoid, minimise and/or off-set the impact on air quality;" and "enable an evidence-based and proportionate approach."

- 2.4 West Sussex County Council published guidance in September 2020 on Parking at New Developments (West Sussex County Council, 2020), which aims to balance the parking needs of new developments with the maintenance of highway network operations, protection of surrounding communities, and encouragement of sustainable modes of transport. The County Council's recommended approach encompasses six principles, including Principle C, "Sustainable Transport", which specifies that the following measures should be available or provided in order to realistically promote lower levels of car ownership and use:

"a) travel plan measures, targeted at reducing vehicle ownership levels such as car clubs;

b) high levels of accessibility to non-car modes of travel and to local amenities and facilities; and

c) comprehensive parking controls; i.e. Controlled Parking Zone."

Local Air Quality Action Plan

- 2.5 HDC's Air Quality Action Plan (Horsham District Council, 2026) sets out a series of measures by which they will seek to achieve the air quality objectives in the AQMA declared in Storrington town centre for exceedances of the annual mean nitrogen dioxide objective. The AQMA is not in close proximity to the proposed development site, as it is located over 19 km away. The measures are thus not relevant to this report, being either focussed on the Storrington AQMA vicinity or general in nature.

3 Assessment Approach

Consultation

- 3.1 The assessment follows a consultation with HDC via email correspondence between Thais Covre Delboni (Air Quality Environmental Protection Officer at HDC) and Sam Murphy (Senior Consultant at Air Quality Consultants) in July 2026. Specific mitigation measures were presented, and it was agreed that where appropriate data are available from the project transport consultants, that the reduction in road traffic emissions brought about by the proposed mitigation measures would be assessed quantitatively.

Existing Conditions

- 3.2 Existing sources of emissions and baseline air quality conditions within the study area have been defined as in the 2025 AQA. Where relevant, 2023 data have been updated with 2024 data for the following:
- information on existing air quality obtained by collating the results of monitoring conducted by the local authority; and,
 - background concentrations defined using Defra's 2021-based background maps (Defra, 2026b).

Modelling

- 3.3 The modelling undertaken and presented in the 2025 AQA has been updated to take account of the most recent tools (including the most recent version of the Emissions Factors Toolkit (v 14.1) published by Defra (Defra, 2026a)), 2024 monitoring data and 2024 meteorological data. The modelling methodology and scenarios are set out below.

Study Area and Receptors

- 3.4 The study area for the mitigation impact assessment is the same as that identified in the 2025 AQA. In summary, it includes Parsonage Road, North Heath Lane and Wimbleshurst Road.
- 3.5 Concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} have been predicted at locations close to the development, as identified in the 2025 AQA. In summary, eight existing residential properties have been identified as receptors for the assessment; these are presented in Appendix A2.

Modelling Methodology

- 3.6 Concentrations have been predicted using the ADMS-Roads dispersion model, with vehicle emissions derived using Defra's Emissions Factors Toolkit (EFT) (v14.1) (Defra, 2026a). The modelling approach is the same as that set out in the 2025 AQA, however, the baseline and meteorological data have been updated to reflect 2024 data. Traffic data have been provided by Paul Basham Associates, including for the updated 2024 baseline year, and for scenarios showing the effects of proposed mitigation measures. Details of these updates to the 2025 AQA model inputs and verification are provided in Appendix A2.

Assessment Scenarios

- 3.7 Nitrogen dioxide, PM₁₀ and PM_{2.5} concentrations for the following:
- base year 2024;

- the proposed year of first occupation of the proposed development (2027) without the development;
- 2027 with the development, without any additional mitigation measures;
- 2027 with the development, with the Travel Plan mitigation measures; and,
- 2027 with the development, with the Travel Plan and car club space mitigation measures.

Uncertainty

- 3.8 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.
- 3.9 An important stage in the process is model verification, which involves comparing the model output with measured concentrations at diffusion tube monitoring site Horsham 7N (see Appendix A2). This is the only site adjacent to a road for which nearby traffic data are available (B2237 Warnham Road). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of base year (2024) concentrations.
- 3.10 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions. Historic versions of Defra's EFT tended to over-state emissions reductions into the future. However, there is good evidence that more recent versions have resolved this issue and can be confidently relied upon (AQC, 2020a; 2020b).

Assumptions

- 3.11 It is necessary to make a number of assumptions when carrying out an air quality assessment; in order to account for some of the uncertainty in the approach, as described above, assumptions made have generally sought to reflect a realistic worst-case scenario. Key assumptions made in carrying out this assessment include:
- that the development is fully operational in 2027; in reality, the development will be built over a number of years. This provides a conservative assessment, as vehicle emissions are projected to reduce into the future as a result of the uptake of low and zero emission vehicles in the vehicle fleet;
 - that the Travel Plan measures would result in immediate benefits in the earliest year of occupation (2027), when in fact Travel Plans do not typically reach their mitigation targets immediately. This approach enables direct comparison with the development-only 2027 scenario and has therefore been considered to be an appropriate;
 - that the car club mitigation measure would not positively impact the fleet makeup of the development generated traffic;
 - that the car club implements one car only (see Paragraph 5.6); and,
 - that the Gatwick meteorological monitoring station appropriately represents conditions in the study area.

4 Baseline Conditions

Local Air Quality Monitoring

- 4.1 Local air quality monitoring results, as reported within the 2025 AQA (taken from HDC's 2024 Annual Status Report (Horsham District Council, 2024)), along with the most recent results for 2024, obtained from HDC's 2025 Annual Status Report (Horsham District Council, 2025), are presented below.
- 4.2 Annual mean nitrogen dioxide results are summarised in Table 4-1, while results relating to the 1-hour mean objective are summarised in Table 4-2. The monitoring locations are shown in Figure 4-1.

Table 4-1: Summary of Annual Mean NO₂ Monitoring (2019-2024) (µg/m³)

Site ID	Site Type	Location	2019	2020	2021	2022	2023	2024
Automatic								
HO2	Roadside	Horsham Park Way	24.4	18.8	21.1	17.7	16.2	15.7
Non-automatic								
1	Roadside	Horsham 1N	26.4	21.6	23.2	22.6	20.9	-
8	Roadside	Horsham 5N	25.2	21.0	22.7	21.6	20.4	18.1
10	Roadside	Horsham 7N	23.0	18.6	19.4	18.9	16.6	13.5
26	Roadside	Horsham 12.1	-	-	-	-	20.1	-
-	Roadside	Horsham 12.2 ^a	-	-	-	-	-	22.0
48	Roadside	Horsham 9N.1	26.5	22.1	23.3	24.1	20.3	17.3
Objective			40					

^a Horsham 12.1 was relocated in 2025 to better represent relevant exposure (Horsham District Council, 2025).

Table 4-2: Number of Hours With NO₂ Concentrations Above 200 µg/m³

Site ID	Site Type	Location	2019	2020	2021	2022	2023	2024
HO2	Roadside	Horsham Park Way	0	0	0	0 (66.3)	0	0
Objective			18 (200) ^a					

^a Values in brackets are 99.79th percentiles, which are presented where data capture is <75%.

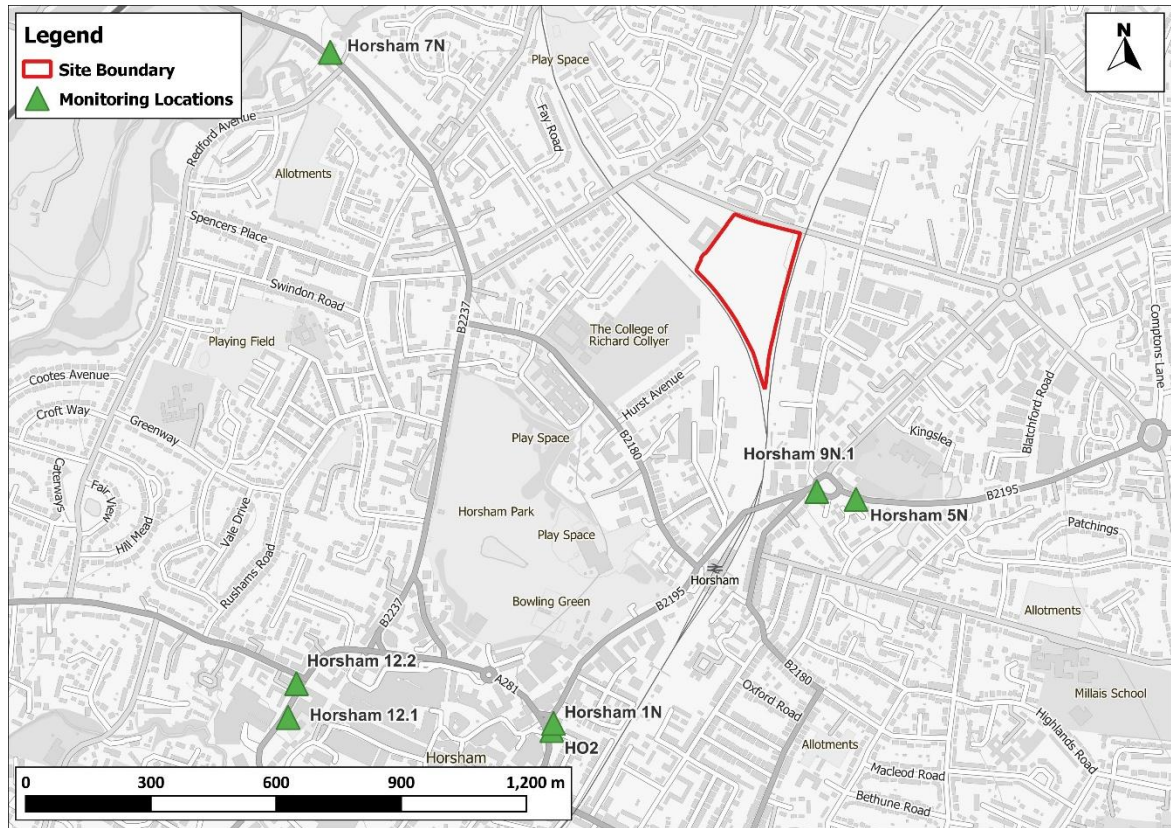


Figure 4-1: Monitoring Locations

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

- 4.3 Annual mean NO₂ concentrations were all well below the objective in the years 2019 to 2024. The automatic monitoring station also measured no exceedances of the 1-hour mean NO₂ objective. Measured concentrations decreased between 2019 and 2024 at all local monitoring sites. Measured concentrations reduced overall between 2019 and 2024, and at all sites which measured concentrations in 2023 and 2024, the measured 2024 concentration was lower. Baseline conditions have therefore continued to improve since the 2025 AQA was prepared.
- 4.4 The HO2 automatic monitoring station also measures PM₁₀ concentrations. Annual mean results for the years 2019 to 2024 are summarised in Table 4-3, while results relating to the daily mean objective are summarised in Table 4-4. Measured concentrations are well below the relevant objectives.

Table 4-3: Summary of Annual Mean PM₁₀ Monitoring (2019-2024) (µg/m³)

Site ID	Site Type	Location	2019	2020	2021	2022	2023	2024
HO2	Roadside	Horsham Park Way	19.3	15.7	17.5	19.3	20.5	16.1
Objective			40					

Table 4-4: Number of Days With PM₁₀ Concentrations Above 50 µg/m³

Site ID	Site Type	Location	2019	2020	2021	2022	2023	2024
HO2	Roadside	Horsham Park Way	5	0	0	0	0	1
Objective			35					

- 4.5 PM_{2.5} concentrations at monitoring site HO2 have been estimated by HDC from measured PM₁₀ concentrations using nationally derived correction factors. The 2024 PM_{2.5} concentration is estimated to be 10.1 µg/m³.

Exceedances of Limit Value

- 4.6 There are no AURN (Defra, 2026d) monitoring sites within 1 km of the site with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2026c), which are used to identify and report exceedances of the limit value, do not identify any exceedances within the study area in 2024.

Background Concentrations

- 4.7 Estimated background concentrations in the study area are set out in Table 4-5 and are all well below the objectives. A range of values is presented as the study area covers multiple 1 x1 km grid squares.

Table 4-5: Estimated Annual Mean Background Pollutant Concentrations in 2024 and 2027 (µg/m³)

Year	NO ₂	PM ₁₀	PM _{2.5}
2024	10.4 – 10.6	10.9 – 11.1	7.0 – 7.1
2027	9.5 – 9.7	10.7 – 10.8	6.8 – 6.9
Objective	40	40	20 ^a
AMCT ^b	-	-	10

^a The 20 µg/m³ PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

^b To be met by 2040

Baseline Dispersion Model Results

- 4.8 Baseline concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} have been modelled at each of the existing receptor locations (see Figure A2-1 and Table A2-1 for receptor locations). The results, which cover both the existing (2024) and future year (2027) baseline (without development), are set out in Table 4-6 for nitrogen dioxide and Table 4-7 for PM₁₀ and PM_{2.5}. The modelled road components of nitrogen oxides have been increased from those predicted by the model based on a comparison with local measurements (see Appendix A2 for the verification methodology).

Table 4-6: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$) at Existing Receptors

Receptor	2024	2027 Without Development
ER1	13.5	11.7
ER2	17.9	14.9
ER3	15.5	13.2
ER4	14.2	12.2
ER5	14.2	12.3
ER6	12.7	11.1
ER7	12.9	11.3
ER8	11.3	10.2
Objective	40	

Table 4-7: Modelled Annual Mean Baseline Concentrations of PM_{10} and $\text{PM}_{2.5}$ at Existing Receptors ($\mu\text{g}/\text{m}^3$)

Receptor	PM_{10}		$\text{PM}_{2.5}$	
	2024	2027 Without Development	2024	2027 Without Development
ER1	11.4	11.2	7.3	7.1
ER2	11.9	11.6	7.7	7.4
ER3	11.6	11.3	7.5	7.2
ER4	11.4	11.2	7.3	7.1
ER5	11.7	11.4	7.5	7.3
ER6	11.3	11.0	7.3	7.0
ER7	11.3	11.0	7.3	7.0
ER8	11.1	10.8	7.1	6.9
Assessment Criterion	32 ^a		20 ^b	

^a While the annual mean PM_{10} objective is $40 \mu\text{g}/\text{m}^3$, $32 \mu\text{g}/\text{m}^3$ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG22 (Defra, 2025). A value of $32 \mu\text{g}/\text{m}^3$ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al., 2017).

^b The $20 \mu\text{g}/\text{m}^3$ $\text{PM}_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

4.9 The predicted annual mean concentrations of nitrogen dioxide are well below the annual mean objective, by more than 50%, in both 2024 and 2027 at all receptors. The annual mean nitrogen

dioxide concentrations are also well below $60 \mu\text{g}/\text{m}^3$ and it is, therefore, unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded.

- 4.10 The predicted annual mean concentrations of PM_{10} and $\text{PM}_{2.5}$ are well below the relevant objectives, by more than 50%, in both 2024 and 2027 at all receptors. The annual mean PM_{10} concentrations are also well below $32 \mu\text{g}/\text{m}^3$ and it is, therefore, unlikely that the 24-hour mean PM_{10} objective will be exceeded.
- 4.11 These results are consistent with the conclusions of HDC in the outcome of its air quality review and assessment work in that they have concluded that there are no exceedances of the objectives, and none have been modelled.

5 Measures to Address the Damage Costs

Calculations

- 5.1 The 2025 AQA presented a damage costs calculation for NO_x and PM_{2.5}, which resulted in a total damage cost of **£37,078**.

Mitigation Measures

- 5.2 The following mitigation measures were agreed with the Environmental Protection Officer at HDC:
- provision of a car club space for either a hybrid or fully electric vehicle, as referenced within the Section 106 agreement; and,
 - financial contribution towards off-site measures using any remaining damage cost funds, to support wider local improvements to sustainable transport, such as:
 - support for the Local Cycling and Walking Infrastructure Plan (LCWIP);
 - improvements to existing cycle paths, including integrating cycle paths within the development design to connect with current networks; and/or
 - support for the delivery of the West Sussex County Council (WSSCC) Bus Service Improvement Plan.
- 5.3 As agreed, the development will provide a car club space with electric vehicle (EV) charging infrastructure, to partially mitigate the damage cost value. This measure is included within the Section 106 agreement, and has been confirmed by PBA to be a measure proposed to support air quality. The car club is proposed to be either a hybrid or fully electric vehicle.
- 5.4 The cost of this measure will depend on which vehicle is adopted. A cost outline from the primary car club operator within Horsham, Co-Wheels, has been provided by Paul Basham Associates and is shown in Table 5-1.

Table 5-1: Cost Outline of Car Club Service for Damage Cost Mitigation

	Year 1	Year 2	Year 3
Hybrid Vehicle – Based on MG3 Hybrid+			
Cost of Vehicle	£5,500		
Telematics Unit & Installation	£800		
Annual Running Costs	£3,980	£3,980	£3,980
Total Cost Per Year	£10,280	£3,980	£3,980
Electric Vehicle – Based on MG4 EV			
Cost of Vehicle	£11,900		
Telematics Unit & Installation	£800		
Annual Running Costs	£3,980	£3,980	£3,980

	Year 1	Year 2	Year 3
Total Cost Per Year	£16,680	£3,980	£3,980

- 5.5 The total cost of the car club over three years is **£18,240** for the hybrid vehicle, or **£24,640** for the EV.
- 5.6 The approved Parking Strategy Plan² allocates two parking bays to the car club. However, only one car club vehicle is proposed to be costed against the damage costs. It is anticipated that should a second car club vehicle be added to meet high demand, it would not be provided by the damage cost mitigation funds. Therefore, the model scenario has assumed that one car club space will be implemented.
- 5.7 After the implementation of the car club, the remaining balance will be provided as a financial contribution towards the following off-site mitigation measures to encourage sustainable modes of transport:
- contribution towards the Local Cycling and Walking Infrastructure Plan (LCWIP);
 - contribution towards the improvement of existing cycle paths, including integrating cycle paths within the development design to connect with current networks; and/or,
 - contribution towards the delivery of the West Sussex County Council (WSCC) Bus Service Improvement Plan.

Additional Mitigation Measures

- 5.8 Other mitigation measures, which have not been counted towards the damage costs, but will be beneficial to air quality nonetheless, include the provision of a Travel Plan, electric vehicles charging points proposed on site, and a financial contribution towards pedestrian crossing improvements.
- 5.9 The impact of these mitigation measures, specifically the Travel Plan was not assessed in the 2025 AQA. The Travel Plan has a target of reducing vehicle movements by 10%. An assessment of the resultant impact on air quality is therefore considered appropriate as this is expected to be a measure which has a direct impact on emissions associated with development-generated traffic.

Modelled Mitigation Measures

- 5.10 Of the proposed measures, air quality impacts of the following have been modelled using traffic data provided by Paul Basham Associates:
- provision of a Travel Plan resulting in a 10% reduction in daily vehicle movements; and
 - provision of a car club vehicle.

² HGP Architects Ltd., Drawing No. 17100-HGP-P3-XX-D-A-0796, Revision No. P10.

6 Impact Assessment

Summary of Development Impact Assessment

- 6.1 Predicted annual mean concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} in 2027 are presented in Appendix A3 for the future year of 2027 without and with the development (without mitigation measures). In summary, the operational air quality effects without mitigation are judged to be 'not significant'. Concentrations at modelled receptors are less than half the relevant criteria for nitrogen dioxide, PM₁₀ and PM_{2.5}, with PM_{2.5} concentrations also well below the AMCT (which is to be met by 2040). The changes in concentrations all range from 0% to 1% of the relevant criteria and thus impacts are all described as negligible.

Assessment of Impacts on Development-Generated Road Traffic Emissions with Mitigation

- 6.2 The impact of the development with the mitigation measures has been compared to the site without the development.
- 6.3 Predicted annual mean concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} in 2027 as a result of the development are set out in Table 6-1, Table 6-2 and Table 6-3 respectively, for the two "Additional Mitigation" scenarios, with the development including the Travel Plan, and with the development including the Travel Plan and car club.

Table 6-1: Predicted Impacts of the Development with Mitigation on Annual Mean Nitrogen Dioxide Concentrations in 2027 (µg/m³)

Receptor	Travel Plan				Travel Plan + Car Club			
	Without Development	With Development	% Change ^a	Impact Descriptor	Without Development	With Development	% Change ^a	Impact Descriptor
ER1	11.7	11.8	0	Negligible	11.7	11.8	0	Negligible
ER2	14.9	15.2	1	Negligible	14.9	15.2	1	Negligible
ER3	13.2	13.4	0	Negligible	13.2	13.4	0	Negligible
ER4	12.2	12.3	0	Negligible	12.2	12.3	0	Negligible
ER5	12.3	12.4	0	Negligible	12.3	12.4	0	Negligible
ER6	11.1	11.3	0	Negligible	11.1	11.3	0	Negligible
ER7	11.3	11.4	0	Negligible	11.3	11.4	0	Negligible
ER8	10.2	10.5	0	Negligible	10.2	10.5	0	Negligible
Objective	40		-	-	40		-	-

^a % changes are relative to the objective and have been rounded to the nearest whole number.

- 6.4 The annual mean nitrogen dioxide concentrations are well below the objective at all receptors, for both mitigation scenarios; predicted concentrations are less than half of the objective. The changes

in concentrations all range from 0% to 1% for both mitigation scenarios and impacts of the development are thus all described as negligible.

Table 6-2: Predicted Impacts of the Development with Mitigation on Annual Mean PM₁₀ Concentrations in 2027 (µg/m³)

Receptor	Travel Plan				Travel Plan + Car Club			
	Without Development	With Development	% Change ^a	Impact Descriptor	Without Development	With Development	% Change ^a	Impact Descriptor
ER1	11.2	11.2	0	Negligible	11.2	11.2	0	Negligible
ER2	11.6	11.7	0	Negligible	11.6	11.7	0	Negligible
ER3	11.3	11.4	0	Negligible	11.3	11.4	0	Negligible
ER4	11.2	11.2	0	Negligible	11.2	11.2	0	Negligible
ER5	11.4	11.4	0	Negligible	11.4	11.4	0	Negligible
ER6	11.0	11.1	0	Negligible	11.0	11.1	0	Negligible
ER7	11.0	11.1	0	Negligible	11.0	11.1	0	Negligible
ER8	10.8	10.9	0	Negligible	10.8	10.9	0	Negligible
Criterion	32 ^b		-	-	32 ^b		-	-

^a % changes are relative to the objective and have been rounded to the nearest whole number.

^b While the annual mean PM₁₀ objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM₁₀ objective is possible. A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM₁₀ objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al., 2017).

- 6.5 The annual mean PM₁₀ concentrations are well below the relevant criterion at all receptors, for both mitigation scenarios. Furthermore, as the annual mean PM₁₀ concentrations are below 32 µg/m³, it is unlikely that the 24-hour mean PM₁₀ objective will be exceeded at any of the receptors. Concentrations are less than half the relevant criteria for both scenarios. The changes in concentrations are all 0% and impacts are thus all described as negligible.

Table 6-3: Predicted Impacts of the Development with Mitigations on Annual Mean PM_{2.5} Concentrations in 2027 (µg/m³)

Receptor	Travel Plan				Travel Plan + Car Club			
	Without Development	With Development	% Change ^a	Impact Descriptor	Without Development	With Development	% Change ^a	Impact Descriptor
ER1	7.1	7.1	0	Negligible	7.1	7.1	0	Negligible
ER2	7.4	7.4	0	Negligible	7.4	7.4	0	Negligible

Receptor	Travel Plan				Travel Plan + Car Club			
	Without Development	With Development	% Change ^a	Impact Descriptor	Without Development	With Development	% Change ^a	Impact Descriptor
ER3	7.2	7.2	0	Negligible	7.2	7.2	0	Negligible
ER4	7.1	7.1	0	Negligible	7.1	7.1	0	Negligible
ER5	7.3	7.3	0	Negligible	7.3	7.3	0	Negligible
ER6	7.0	7.0	0	Negligible	7.0	7.0	0	Negligible
ER7	7.0	7.0	0	Negligible	7.0	7.0	0	Negligible
Criterion	20 ^b		-	-	20 ^b		-	-
AMCT	10 ^c		-	-	10 ^c		-	-

^a % changes are relative to the objective and have been rounded to the nearest whole number.

^b The PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

^c To be met by 2040, and provided here for reference only.

- 6.6 The annual mean PM_{2.5} concentrations are well below the relevant criteria at all receptors, for both mitigation scenarios. Concentrations are less than half the relevant criterion and well below the AMCT, which is to be met by 2040. The changes in concentrations are all 0% and impacts are thus all described as negligible.

Significance of Mitigated Development Effects

- 6.7 The air quality effects of the development with mitigation measures are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A4, and takes account of the assessment that pollutant concentrations at all of the selected worst-case existing receptors along the local road network will be well below the air quality objectives, and all of the impacts are predicted to be negligible.

Impacts of the Mitigation Measures

- 6.8 Predicted annual mean concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} in 2027 for existing receptors are set out in Table 6-4, Table 6-5 and Table 6-6 respectively, for the "Without Development" and "With Development No Mitigation", "With Development + Travel Plan" and "With Development + Travel Plan and Car Club" scenarios.
- 6.9 It is not possible for any measure to remove the generated emissions entirely, as the development is built on vacant land and therefore all emissions are new. Notwithstanding, the impacts of the proposed development on local air quality are negligible (see Appendix A3); concentrations remain well below the relevant objectives even with the proposed development in place, consistent with the nearby monitoring data. The measures proposed will result in fewer vehicle trips on the local road network, and whilst the reduction does not result in a measurable improvement (to one decimal place), they are considered proportionate given the small predicted increase in nitrogen dioxide concentrations even without mitigation.

Table 6-4: Predicted Impacts on Annual Mean Nitrogen Dioxide Concentrations in 2027 ($\mu\text{g}/\text{m}^3$)

Receptor	Without Development	With Development – No Mitigation	With Development + Travel Plan	With Development + Travel Plan and Car Club
ER1	11.7	11.8	11.8	11.8
ER2	14.9	15.2	15.2	15.2
ER3	13.2	13.4	13.4	13.4
ER4	12.2	12.3	12.3	12.3
ER5	12.3	12.4	12.4	12.4
ER6	11.1	11.3	11.3	11.3
ER7	11.3	11.4	11.4	11.4
ER8	10.2	10.5	10.5	10.5

Table 6-5: Predicted Impacts on Annual Mean PM_{10} Concentrations in 2027 ($\mu\text{g}/\text{m}^3$)

Receptor	Without Development	With Development – No Mitigation	With Development + Travel Plan	With Development + Travel Plan and Car Club
ER1	11.2	11.2	11.2	11.2
ER2	11.6	11.7	11.7	11.7
ER3	11.3	11.4	11.4	11.4
ER4	11.2	11.2	11.2	11.2
ER5	11.4	11.4	11.4	11.4
ER6	11.0	11.1	11.1	11.1
ER7	11.0	11.1	11.1	11.1
ER8	10.8	10.9	10.9	10.9

Table 6-6: Predicted Impacts on Annual Mean $\text{PM}_{2.5}$ Concentrations in 2027 ($\mu\text{g}/\text{m}^3$)

Receptor	Without Development	With Development – No Mitigation	With Development + Travel Plan	With Development + Travel Plan and Car Club
ER1	7.1	7.1	7.1	7.1
ER2	7.4	7.4	7.4	7.4
ER3	7.2	7.2	7.2	7.2
ER4	7.1	7.1	7.1	7.1
ER5	7.3	7.3	7.3	7.3

Receptor	Without Development	With Development – No Mitigation	With Development + Travel Plan	With Development + Travel Plan and Car Club
ER6	7.0	7.0	7.0	7.0
ER7	7.0	7.0	7.0	7.0
ER8	6.9	6.9	6.9	6.9

7 Conclusions

- 7.1 This report presents the Air Quality Mitigation Measures agreed in consultation with the Environmental Protection Officer at HDC, along with the predicted impacts of the mitigation measures where the resulting reduction in traffic flow is quantifiable. The cost of the proposed measures will meet the calculated damage cost.
- 7.2 It is judged that the proposed development is consistent with the Sussex-air Guidance on Air Quality and Emissions Mitigations (Sussex-air, 2021), as the proposed mitigations help to minimise the impact of development-generated traffic on air quality, through measures which are proportionate to the predicted negligible impact.
- 7.3 The proposed measures also have regard to the guidance on Parking at New Developments (West Sussex County Council, 2020), specifically for sustainable transport, through the provision of car club spaces, pedestrian and cycle access, and allocated parking strategy.

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9 Glossary

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System model for Roads
AMCT	Annual Mean Concentration Target (for PM _{2.5})
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
Defra	Department for Environment, Food and Rural Affairs
EFT	Emissions Factors Toolkit
EPUK	Environmental Protection UK
EV	Electric Vehicle
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	His Majesty's Stationery Office
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
µg/m ³	Microgrammes per cubic metre
NO	Nitric oxide
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides (taken to be NO ₂ + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PERT	Population Exposure Reduction Target (for PM _{2.5})
PM ₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter

PM _{2.5}	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
Standards	A nationally defined set of concentrations for nine pollutants based on assessment of the effects of each pollutant on human health, including the effects on sensitive sub-groups

10 Appendices

A1 Professional Experience

Michelle Wan, BA (Hons) MSci MRes MA

Miss Wan is an Assistant Consultant and joined AQC in 2026. She is completing her PhD at the University of Cambridge, following an MRes in Environmental Data Science, and MSci in Natural Sciences. Her PhD research focuses on applying machine learning methods to impute missing air quality data, and model the health impacts of air quality and socioeconomic inequity. She is currently developing experience in conducting air quality assessments, building on prior training in geoprocessing and dispersion modelling. She has also applied her technical experience in programming and data science to bespoke air quality projects.

Sam Murphy, MSci AMIEnvSc

Mr Murphy is a Senior Air Quality Consultant with over five years of experience. He has previously worked in both medium-sized and large multidisciplinary consultancies and holds a Master's degree in Environmental Sciences from the University of East Anglia. Mr Murphy has extensive experience supporting built environment projects with air quality consultancy, including housing-led, mixed-use, and industrial developments. His experience spans the full project lifecycle, from early-stage due diligence and feasibility studies through to planning applications, discharge of planning conditions, detailed design, and contributions to Environmental Statement chapters. He is an Associate Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.

Dr Denise Evans, BSc (Hons) PhD MIEnvSc MIAQM

Dr Evans is a Technical Director with AQC, with more than 25 years' relevant experience. She has prepared air quality review and assessment reports for local authorities, and has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

A2 Modelling Methodology

Receptors

- A2.1 Concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} have been predicted at locations close to the development, as identified in the 2025 AQA. These locations are described in Table A2-1 and shown in Figure A2-1. Concentrations have been predicted at a height of 1.5 m, representing ground-floor level exposure.

Table A2-1: Description of Receptor Locations

Receptor	Type	X coordinate	Y coordinate
ER1	Residential	517974.8	131832.5
ER2	Residential	517736.6	131933.1
ER3	Residential	517713.7	131943.9
ER4	Residential within Phase 1 / 2	517708.8	131907.8
ER5	Residential	518001.3	131822.1
ER6	Residential	517911.4	131859.5
ER7	Residential within Phase 1 / 2	517773.8	131889.4
ER8	Residential within Phase 1 / 2	517914.4	131816.0

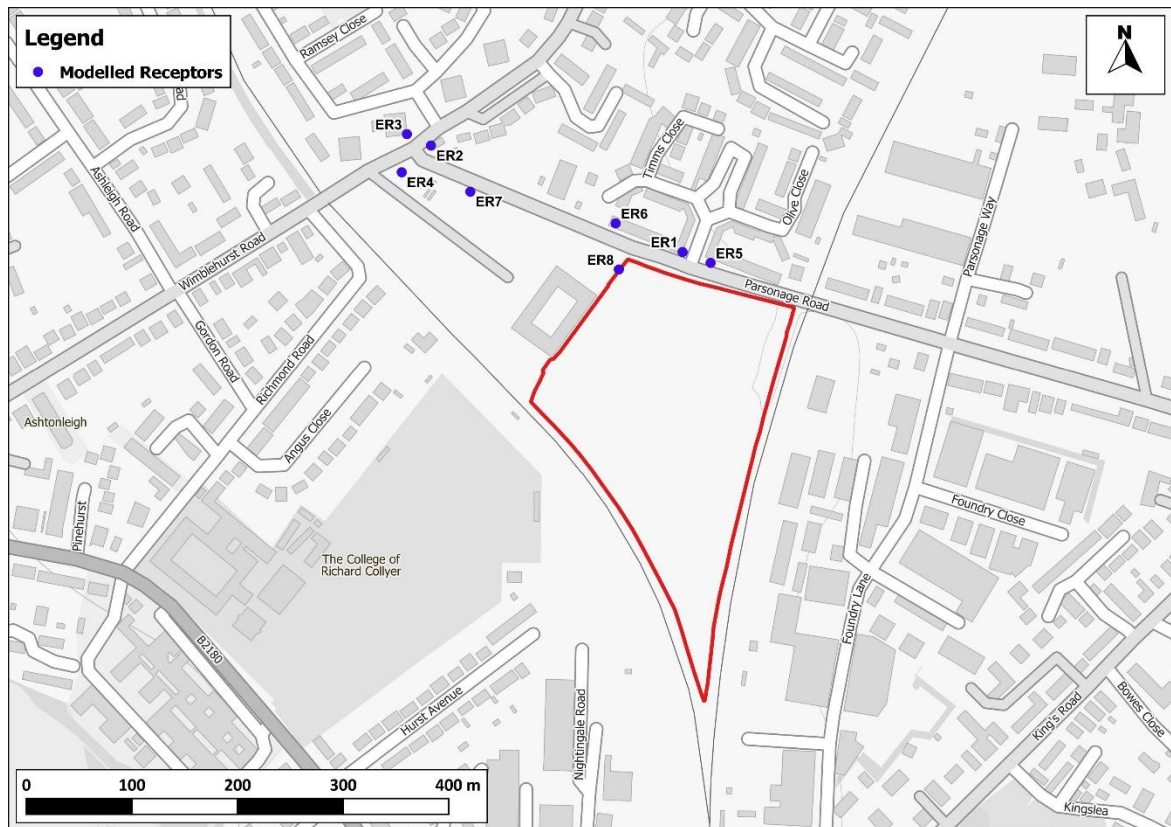


Figure A2-1: Receptor Locations

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

Model Inputs

- A2.2 As in the 2025 AQA, predictions have been carried out using the ADMS-Roads dispersion model (v5.1). Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the latest EFT (Version 14.1) published by Defra (Defra, 2026a). Model input parameters are unchanged from the 2025 AQA; the data year for the meteorological monitoring site (London Gatwick Airport) has been updated from 2023 to 2024.
- A2.3 AADT flows have been updated where necessary by Paul Basham Associates, who undertook the transport assessment work for the proposed development. The traffic data used in this assessment are summarised in Table A2-2. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2025). Figure A2-2 shows the modelled road links and speeds for the roads model.

Table A2-2: Summary of Traffic Data used in the Assessment

Road Name	Link ID	AADT					%HDV
		2024 Baseline	2027 Baseline	2027 with Development	2027 with Development + Travel Plan	2027 with Development + Travel Plan + Car Club	
Parsonage Road (West of Site Access)	1, 2, 5	8,242	8,566	9,242	9,174	9,170	8.0
Parsonage Road (East of Site Access)	3, 4, 6, 9	7,931	8,245	8,535	8,506	8,504	7.0
B2337	7, 8	13,207	13,726	13,899	13,882	13,881	2.0
North Heath Lane	10, 14	9,987	10,570	10,899	10,866	10,864	2.0
Wimblehurst Road	11, 12, 13	13,224	13,990	14,338	14,303	14,301	2.0
Site Access Road	18	0	0	966	869	863	0.0

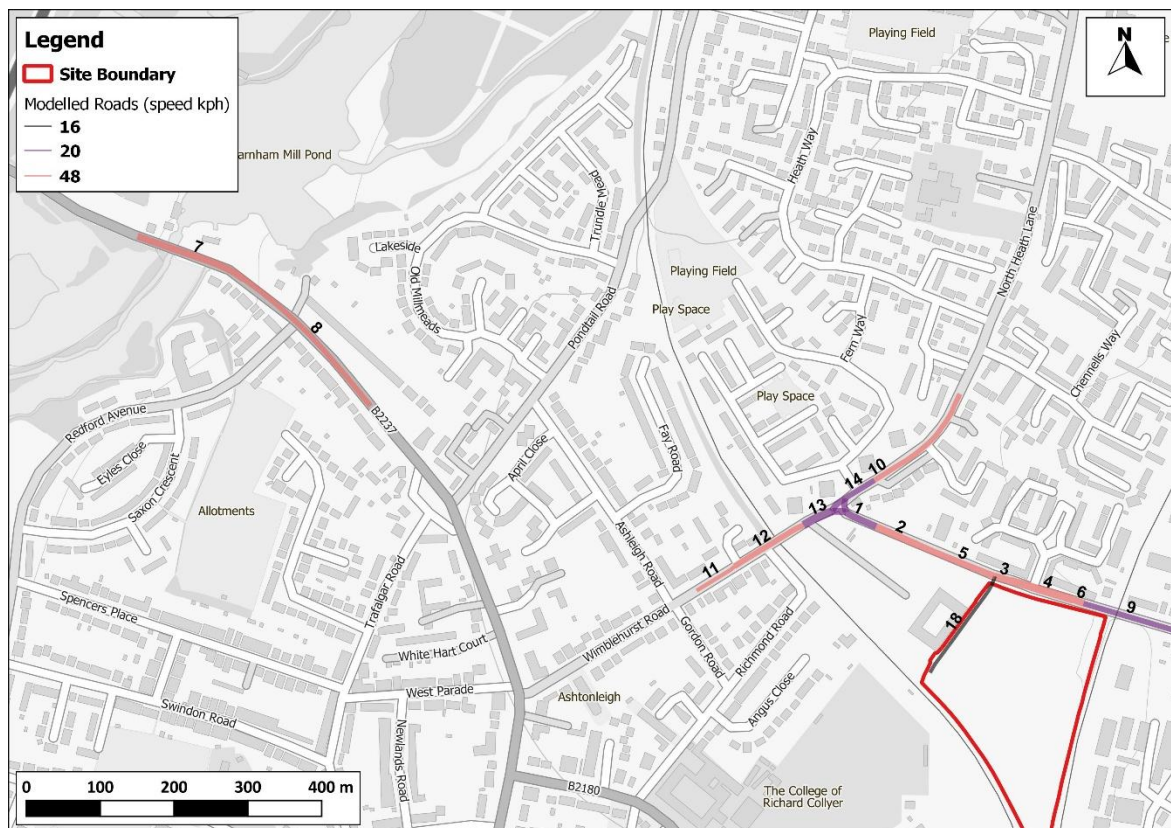


Figure A2-2: Modelled Road Network and Speed

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

- A2.4 Hourly sequential meteorological data in sectors of 10 degrees from Gatwick for 2024 have been used in the model, updated from 2023 data used in the 2025 AQA. A wind rose for the site for the year 2024 is provided in Figure A2-3. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

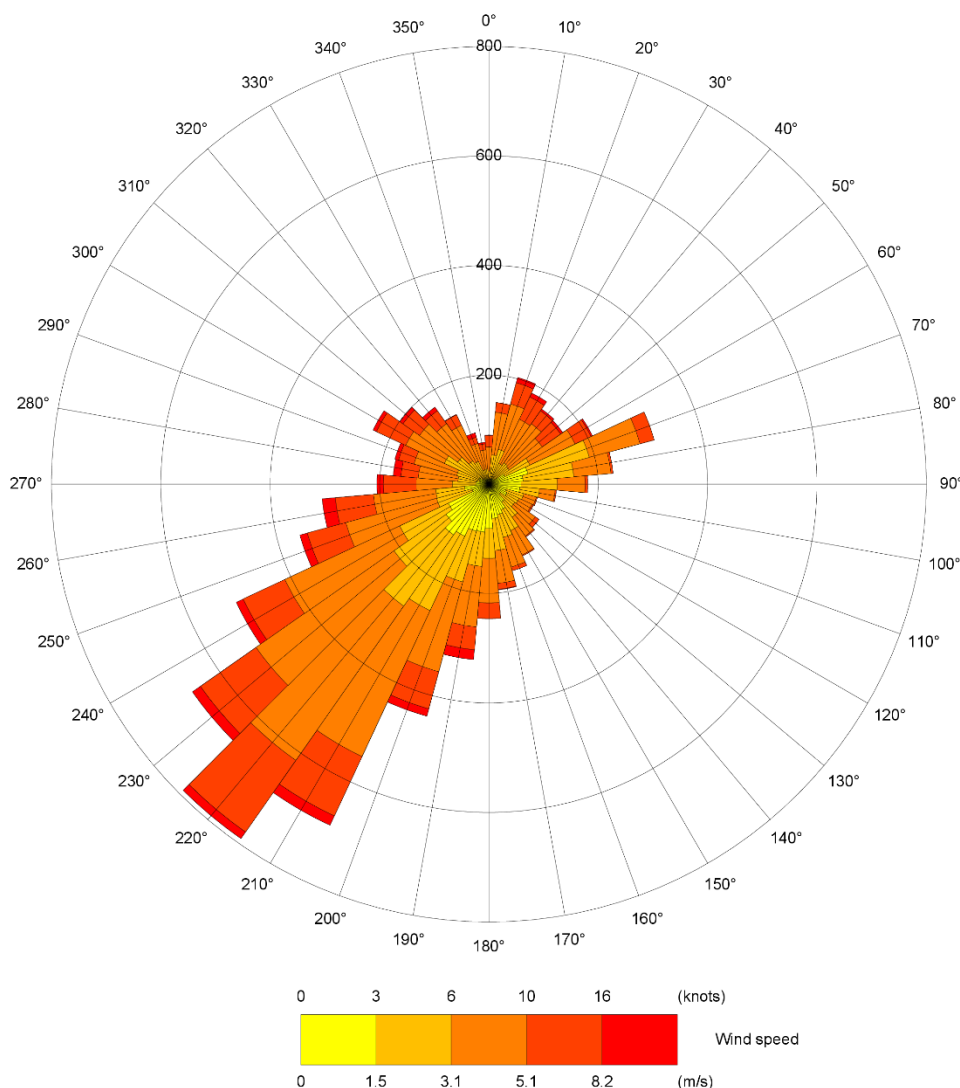


Figure A2-3: Gatwick Wind Rose 2024

Model Verification

Nitrogen Dioxide

- A2.5 Most nitrogen dioxide (NO_2) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore 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 has been run to predict the annual mean NO_x concentrations during 2024 at diffusion tube site Horsham 7N, located adjacent to the B2237. Concentrations have been modelled at 2.2 m, the height of the diffusion tube reported in the 2024 ASR (Horsham District Council, 2024) and used in the 2025 AQA. It has been noted that the 2025 ASR (Horsham District Council, 2025) reports the height of the diffusion tube to be 2.3 m. However, visual

review of the diffusion tube site concludes that the height of 2.2 m is considered to be appropriate. A difference of 0.1 m would not materially affect the model verification.

- A2.6 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. Measured road-NO_x has been calculated from the measured NO₂ concentration and the predicted background NO₂ concentration using the NO_x from NO₂ calculator (Version 9.1) available on the Defra LAQM Support website (Defra, 2026a).
- A2.7 An adjustment factor has been determined as the ratio of the 'measured' road contribution and the model derived road contribution. The data used to calculate the adjustment factor are provided below:
- Measured NO₂: 13.5 µg/m³
 - Background NO₂: 9.0 µg/m³
 - 'Measured' road-NO_x (using NO_x from NO₂ calculator): 9.6 µg/m³
 - Modelled road-NO_x: 5.2 µg/m³
 - Road-NO_x adjustment factor: $9.6/5.2 = 1.83^3$
- A2.8 The factor implies that the unadjusted model is under-predicting the road-NO_x contribution. This is a common experience with this and most other road traffic emissions dispersion models.
- A2.9 The predicted concentrations at each receptor location have been adjusted using the adjustment factor set out above, which, along with the background NO₂, has been processed through the NO_x to NO₂ calculator available on the Defra LAQM Support website (Defra, 2026a). The traffic mix within the calculator has been set to "All other urban UK traffic", which is considered suitable for the study area. The calculator predicts the component of NO₂ based on the adjusted road-NO_x and the background NO₂.
- A2.10 The model verification for nitrogen dioxide is based on a single monitoring site; statistical analysis is not appropriate for a single data point, and is only presented where there are a minimum of five monitoring sites included. The correlation coefficient is not applicable (as there is only 1 site), the RMSE is zero (ideal value is zero), and the fractional bias is zero (ideal value is zero).
- A2.11 Whilst it is preferable to include more monitoring sites within the model verification, the ability to include these relies on the availability of traffic data adjacent to the monitoring sites. The assessment has included one monitoring site as this was the only site for which traffic data were available nearby. The calculated verification factor (1.83) is similar to the value calculated for numerous studies undertaken by AQC, and the predicted concentrations at receptors within the study area in 2024 (Table A3-1) are consistent with local measured values in 2024 (Table 4-1).

PM₁₀ and PM_{2.5}

- A2.12 As discussed in the 2025 AQA, there is currently no strong basis for applying any adjustment to the model outputs for PM₁₀ and PM_{2.5}. Predicted concentrations of PM₁₀ and PM_{2.5} have thus not been adjusted.

³ Based on unrounded values.

A3 Development Impact Assessment

Detailed Assessment of Development-Generated Road Traffic Emissions Without Mitigations

Impact Description

- A3.1 The approach developed jointly by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)⁴ (Moorcroft and Barrowcliffe et al., 2017) has been used to describe the modelled impacts. The approach identifies impacts at individual receptors based on the percentage change in concentrations relative to the relevant air quality objective, rounded to the nearest whole number, and the absolute concentration relative to the objective. For the assessment criterion the term Air Quality Assessment Level or AQAL has been adopted, as it covers all pollutants, i.e. those with and without formal standards. Typically, as is the case for this assessment, the AQAL will be the air quality objective value.

Nitrogen Dioxide

- A3.2 Predicted annual mean concentrations of nitrogen dioxide in 2027 for existing receptors are set out in Table A3-1 for both the "Without Development" and "With Development" scenarios.

Table A3-1: Predicted Impacts on Annual Mean Nitrogen Dioxide Concentrations in 2027 ($\mu\text{g}/\text{m}^3$)

Receptor	Without Development	With Development	% Change ^a	Impact Descriptor
ER1	11.7	11.8	0	Negligible
ER2	14.9	15.2	1	Negligible
ER3	13.2	13.4	0	Negligible
ER4	12.2	12.3	0	Negligible
ER5	12.3	12.4	0	Negligible
ER6	11.1	11.3	0	Negligible
ER7	11.3	11.4	0	Negligible
ER8	10.2	10.5	1	Negligible
Objective	40		-	-

^a % changes are relative to the objective and have been rounded to the nearest whole number.

- A3.3 The annual mean nitrogen dioxide concentrations are well below the objective at all receptors; predicted concentrations are in fact less than half of the objective. The changes in concentrations all range from 0% to 1% and impacts are thus all described as negligible.

⁴ The IAQM is the professional body for air quality practitioners in the UK.

PM₁₀ and PM_{2.5}

A3.4 Predicted annual mean concentrations of PM₁₀ and PM_{2.5} in 2027 for existing receptors are set out in Table A3-2 for both the “Without Development” and “With Development” scenarios. The AMCT value is also provided in Table A3-2 for reference.

Table A3-2: Predicted Impacts on Annual Mean PM₁₀ and PM_{2.5} Concentrations in 2027 (µg/m³)

Receptor	Annual Mean PM ₁₀ (µg/m ³)				Annual Mean PM _{2.5} (µg/m ³)			
	Without Development	With Development	% Change ^a	Impact Descriptor	Without Development	With Development	% Change ^a	Impact Descriptor
ER1	11.2	11.2	0	Negligible	7.1	7.1	0	Negligible
ER2	11.6	11.7	0	Negligible	7.4	7.4	0	Negligible
ER3	11.3	11.4	0	Negligible	7.2	7.2	0	Negligible
ER4	11.2	11.2	0	Negligible	7.1	7.1	0	Negligible
ER5	11.4	11.4	0	Negligible	7.3	7.3	0	Negligible
ER6	11.0	11.1	0	Negligible	7.0	7.0	0	Negligible
ER7	11.0	11.1	0	Negligible	7.0	7.0	0	Negligible
ER8	10.8	10.9	0	Negligible	6.9	6.9	0	Negligible
Criterion	32 ^b		-	-	20 ^c		-	-
AMCT	-		-	-	10 ^d		-	-

^a % changes are relative to the criterion and have been rounded to the nearest whole number.

^b While the annual mean PM₁₀ objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM₁₀ objective is possible. A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM₁₀ objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al., 2017).

^c The PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

^d To be met by 2040, and provided here for reference only.

A3.5 The annual mean PM₁₀ and PM_{2.5} concentrations are well below the relevant criteria at all receptors, with or without the proposed development. Furthermore, as the annual mean PM₁₀ concentrations are below 32 µg/m³, it is unlikely that the 24-hour mean PM₁₀ objective will be exceeded at any of the receptors. Concentrations are less than half the relevant criteria for both PM₁₀ and PM_{2.5}, with PM_{2.5} concentrations also well below the AMCT, which is to be met by 2040. The changes in concentrations are all 0% and impacts are thus all described as negligible.

Significance of Operational Air Quality Effects

A3.6 The operational air quality effects without mitigation are judged to be ‘not significant’. This professional judgement is made in accordance with the methodology set out in Appendix A4, and

takes account of the assessment that pollutant concentrations at all of the selected worst-case existing receptors along the local road network will be well below the air quality objectives, and all of the impacts are predicted to be negligible.

A4 EPUK & IAQM Planning for Air Quality Guidance

A4.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al., 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

“Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations”.*

Recommended Best Practice

A4.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

“The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions”.

A4.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m² of commercial floorspace;
- are carried out on land of 1 ha or more.

A4.4 The good practice principles are that:

- new developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- wherever possible, new developments should not create a new “street canyon”, as this inhibits pollution dispersion;
- delivering sustainable development should be the key theme of any application;
- new development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;

- the provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1,000 m² of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- all gas-fired boilers to meet a minimum standard of <40 mgNO_x/kWh;
- where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
 - Spark ignition engine: 250 mgNO_x/Nm³;
 - Compression ignition engine: 400 mgNO_x/Nm³;
 - Gas turbine: 50 mgNO_x/Nm³.
- a presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNO_x/Nm³ and 25 mgPM/Nm³.

A4.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A4.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- support and promotion of car clubs;
- contributions to low emission vehicle refuelling infrastructure;
- provision of incentives for the uptake of low emission vehicles;
- financial support to low emission public transport options; and
- improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A4.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

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

A4.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A4.9 If the above do not apply, then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;

- the development will 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; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A4.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A4.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A4.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A4.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A4.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

- A4.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:
- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
 - a judgement on the overall significance of the effects of any impacts.
- A4.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:
- the existing and future air quality in the absence of the development;
 - the extent of current and future population exposure to the impacts;
 - the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
 - the potential for cumulative impacts and, in such circumstances, several impacts that are described as 'slight' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a 'moderate' or 'substantial' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
 - the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.
- A4.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.
- A4.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A1.



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