REPORT

HORSHAM ENTERPRISE PARK

HORSHAM

AIR QUALITY ASSESSMENT
RWDI # 2509761_03
27 October 2025

SUBMITTED TO

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LOVELL PARTNERSHIPS LIMITED
HORSHAM ENTERPRISE PARK
AIR QUALITY ASSESSMENT

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01	Draft	Draft report for client comment	07.04.25
02	Final	Final Issue	07.04.25
03	Final	Revisions made to Dust Risk Assessment	27.10.25

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1 INTRODUCTION

1.1 Project Overview

RWDI was commissioned to prepare an air quality assessment for the proposed development Horsham Enterprise Park, along Parsonage Road. The site falls within the administrative boundary of Horsham District Council (HDC).

This assessment has been prepared to determine the likely air quality impacts from the development of the site on existing and introduced receptors, to accompany a planning application.

1.2 Report Structure

Details of the site and the proposed development are presented in the following section of this report. Section 2 details the site and proposed development details. Relevant air quality policy and guidance are outlined in Section 3 and the assessment methodology is detailed in Section 4. The existing baseline conditions are presented in Section 5. Impacts from construction and operation are assessed in Sections 6 and 7, respectively. Section 8 details the damage cost assessment and mitigation measures are presented in Section 9. The assessment is summarised in Section 10.

2 SITE DETAILS

2.1 Site Description

The proposed site is located on the former Novartis pharmaceutical facility that lies to the north of Horsham town centre. The site is bounded by a railway line to the south-west, and Wimblehurst Road and Parsonage Road to the north-west and north, respectively. To the southeast of the site, lies the rest of the former Novartis pharmaceutical facility, now Horsham Enterprise Park, that is currently disused.

The surrounding area comprises predominantly residential estates and industrial facilities further to the east and south.

2.2 Proposed Development

The proposed development covers the northwestern section of the Horsham Enterprise Park. It will consist of the erection of 159 apartments and 47 residential houses alongside 252 car parking spaces (12 of which are blue badge) and associated infrastructure.

2.3 Study Area

Locations where people or wildlife may be adversely affected by changes in air quality or dust soiling are considered relevant receptors for air quality.

For dust soiling, high-sensitivity receptors may include both residential and ecological receptors, whilst medium to low sensitivity receptors may include amenity areas and workplaces.

There are no ecological receptors within close proximity of the development site and therefore have been screened out.

Several receptors are located in the vicinity of the proposed development site, which could potentially be affected by changes in air quality arising from the construction and operation of the development. These include residential properties to the north and west of the site.

3 LEGISLATION, POLICY AND GUIDANCE

3.1 Introduction

Atmospheric pollutants of general concern associated with the impacts of developments on human receptors are nitrogen dioxide (NO_2) and particulate matter (PM).

NO_2 is produced through the combustion of fossil fuels, used for transport and energy supply. Emissions of oxides of nitrogen (NO_X) from exhausts comprise of nitric oxide (NO) and NO_2. NO undergoes oxidisation in the atmosphere to form NO_2. High concentrations of NO_2 can cause lung inflammation, shortness of breath and coughing, and reduced immunity to lung infections like bronchitis.

PM can result directly as emissions from local sources (primary), or further afield, often having originated as other pollutants and reformed in the atmosphere (secondary). Primary sources of particulates are of most relevance to this assessment and can include emissions from combustion processes and dust from construction activities. Exposure to high concentrations of particulate matter can cause respiratory and cardiovascular illness and death. PM_{10} is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 10 microns (μm) or less, whilst $PM_{2.5}$ is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 2.5 microns or less. PM_{10} and $PM_{2.5}$ are respirable and can be drawn deep into the lungs and cause health problems. The fraction of dust that is larger than 10 μm is filtered by the nose and throat.

3.2 Legislation

The EU Air Quality Directive (Directive 2008/50/EC) [1] came into force in June 2008 and was transposed into legislation in England, Wales, Scotland and Northern Ireland in the Air Quality Standards Regulations 2010 [2], since amended by the Air Quality Standards (Amendment) Regulations 2016 [3]. The Directive introduced legally binding targets for national governments to reduce air pollution to levels at which no or minimal effects on human health are likely to occur. The obligation to meet the requirements of the Directive falls primarily upon the Secretary of State for the Environment in England, and appropriate Ministers in the Devolved Administrations, who are designated as the appropriate "competent authority".

Defra's Air Quality Plan for Nitrogen Dioxide (NO_2) in UK (2017) [4] details the government's plan for reducing roadside NO_2 levels and achieving EU limit values. A supplement to the plan was published in October 2018.

The Air Quality (England) Regulations 2000 [5], as amended [6] define air quality 'objectives' for a number of key pollutants. The Air Quality Objectives (AQOs) are set at a range of different levels and averaging times for different pollutants.

The NO_2 and PM objectives are summarised in Table 3.1 overleaf. The annual mean (long-term) objective applies at locations where individuals might be expected to spend a large majority of their time, for example residential properties. In the case of the hourly mean (short-term), this applies at locations where people might reasonably be expected to spend at least an hour (such as outdoor spaces and leisure areas).

Table 3.1: Summary of Relevant UK Air Quality Objectives for Protection of Human Health

Pollutant	Air Quality Objective		Date to be Achieved by
NO_2	40 µg/m^3	annual mean	31 December 2005
	200 µg/m^{3}not to be exceeded more than 18 hours in a year	hourly mean	31 December 2005
PM_{10}	50 µg/m^{3}not to be exceeded more than 35 times a year	24-hour mean	31 December 2004
	40 µg/m^3	annual mean	31 December 2004
$PM_{2.5}$	20 µg/m^3	annual mean	1 January 2020
	15% reduction urban background	annual mean	2010-2020

The Environment Act 1995 [7] introduced the requirement for local authority management of air quality. Part IV of the Act details the duties of local authorities in carrying out their local air quality management (LAQM) responsibilities.

The UK government published the Environment Act 2021 [8]. The act makes provision of about targets, plans and policies for improving the natural environmental, and the environmental protection about air quality. The act highlights that the Secretary of State must by regulations set a target value for $PM_{2.5}$ annual mean concentrations in ambient air [9].

A new Air Quality Strategy (AQS) for England has been published in April 2023 [10]. The AQS sets out the actions the government expects local authorities to take in support of achieving government long-term air quality goals, including new $PM_{2.5}$ targets values. as summarised in Table 3.2.

Table 3.2: $PM_{2.5}$ UK Target Values

Pollutant & Metric	Target	Target Year
$PM_{2.5}$ annual mean concentration	Interim target: 12 µg/m^3	2028
	Legally binding target: 10 µg/m^3	2040
$PM_{2.5}$ population exposure	Interim target: 22% reduction in exposure compared to 2018	2028
	Legally binding target: 35% reduction in exposure compared to 2018	2040

The Environmental Protection Act 1990 (EPA) [11] deals with statutory nuisance. Nuisance caused by dust is regulated by the statutory nuisance provisions under Part III and is defined in s.79(1)(d) as: "*Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance*".

Statutory nuisance is not intended to secure a high level of amenity but rather to act as a basic safeguard on emissions. The perpetrator of any alleged nuisance has a defence of best practicable means (BPM) which provides a basis for balancing the interests of the site and residents.

There are no UK standards or statutory guidance relating to deposited dust and nuisance, although a deposition rate of 200 $mg/m^2/day$ is often used as a threshold for potentially significant nuisance effects.

The Clean Air Act 1993 (CAA) [12] details the legislative requirements for the heights of chimneys and flues where the burn rates exceed certain criteria. For appliances fuelled by gaseous matter the relevant criterion value is 366.4kW.

3.3 Policy and Guidance

National Policy and Guidance

The National Planning Policy Framework (NPPF) was first published in 2012 and subsequently updated in December 2024 [13]. Paragraph 199 states:

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

The roles of the planning authority and pollution control authorities are defined in paragraph 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*."

The National Planning Practice Guidance (NPPG) [14] provides guiding principles on how planning can consider of the impact of new development on air quality. It includes guidance on:

- air quality considerations for planning;
- plan-making and air quality;
- air quality and neighbourhood planning;
- available information;

- when air quality considerations could be relevant to development planning;
- specific issues when assessing air quality impacts;
- required detail for air quality assessments; and
- mitigating air quality impacts.

The guidance provides a flow chart detailing the process that should be followed in determining an application. It indicates that an application should proceed to decision with appropriate planning conditions or obligations if the proposed development, with mitigation in place, would not lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or fail to comply with the requirements of the Habitats Regulations [15].

Local Air Quality Policy

Under the Local Development Framework (LDF) strategy, local authorities are required to prepare an overarching Core Strategy document. Horsham District's Planning Framework (excluding South Downs National Park) was adopted in 2015 and covers the period up to 2031 [16].

The new Local Plan covering the period from 2019 to 2036 was submitted for consultation in March 2020 and aims to deliver the social, economic and environmental needs of Horsham District [17]. HDC's new local plan has since been delayed and in December 2023 HDC approved the Horsham District Local Plan for 2023 to 2040 and recommended that it proceeds to the next stage of preparation with the aim to adopt the local plan in 2025. As of February 2025, the Inspector has detailed they will aim to review the Local Plan towards end of February/early March 2025 at the earliest.

The new proposed Local Plan is due to supersede Horsham District's 2015 Local Plan upon final publication in September 2025. Spatial Objectives 8 and 9 relating to air quality within the proposed Local Plan aim to:

"Identify and preserve the unique landscape character and the contribution that this makes to the setting of rural villages and towns and ensure that new development minimises the impact on the countryside"; and

"safeguard and enhance the environmental quality of the District, ensuring that development brings forward environmental net gains including biodiversity enhancements, and minimises the impact on environmental quality including air, soil, water quality and the risk of flooding".

Policy 26 – Air Quality, of the new proposed Local Plan, states:

"The Council recognises the importance of the management of air quality. Taking into account any relevant Planning Guidance Documents, proposals will be required to:

1. *Take account of The Air Quality and Emissions Mitigation Guidance for Sussex (2019), or any future updates. Major development proposals and proposals within an Air Quality Management Area (AQMA), or in relevant proximity to an AQMA, must be accompanied by an Air Quality Impact Assessment and an Emissions Mitigation Assessment;*

2. *Contribute to the implementation of local Air Quality Action Plans, and not conflict with the set objectives;*

3. *Minimise traffic generation and congestion through access to sustainable transport modes, maximising the provision for cycling and pedestrian facilities;*

4. *Encourage the use of cleaner transport fuels, including through the provision of electric car charging points;*

5. *Mitigate the impact on the amenities of users of the site and surrounding land to an appropriate level, where development creates or results in pollution including particulates, dust, smoke, pollutant gases or odour; and*

6. *Ensure that the cumulative impact of all relevant committed developments is appropriately assessed."*

Under the local air quality management regime introduced by the Environment Act 1995 and subsequent regulations, HDC is required to review and assess its air quality at regular intervals. As detailed in the 2024 Air Quality Annual Status Report (ASR) [18], there are currently two Air Quality Management Areas (AQMA) declared in in the district in the village of Cowfold (Cowfold AQMA) and the town centre of Storrington (Storrington AQMA), in 2011 and 2010, respectively. Both declarations were made on the basis that the annual mean nitrogen dioxide (NO_2) concentrations would not meet the national AQO. Air Quality Action Plans (AQAP) were prepared for both.

The latest revision of the West Sussex County Council's (WSCC) AQAP: *'Breathing Better'* published in January 2020 [19] and updated in September 2023 [20] provides measures for improving air quality within the administrative area. This document contains proposed actions such as: increasing the uptake of low emission and electric vehicles and the introduction of electric vehicle charging points, identifying and implementing sustainable transport infrastructure and traffic management schemes, exploring behaviour change initiatives and engaging residents and businesses in activities that will benefit local air quality.

HDC, along with several other Sussex local authorities (the 'Sussex Air Quality Partnership'), developed the 'Air quality and emissions mitigation guidance for Sussex' [21] for the assessment of developments. This provides checklists to determine whether a development requires consideration with regard to air quality, and whether a full air quality assessment is required, or just an emissions mitigation assessment. An emissions mitigation assessment involves establishing the likely emissions from a development and calculating an appropriate monetary value to be applied to air quality mitigation measures within the development.

3.4 Non-Statutory Guidance

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced a document entitled: *Land-Use Planning & Development Control: Planning for Air Quality* [22] that provides guidance on how to ensure that air quality is properly accounted for in the development control process. This guidance provides advice on describing air quality impacts and assessing their significance.

The Institute of Air Quality Management (IAQM) has published specific *'Guidance on the assessment of dust from demolition and construction'* [23] to provide guidance and good-practice approaches on the assessment and mitigation of dust impacts from demolition and construction site activities. The impacts naturally depend on any incorporated mitigation and the emphasis in these guidelines is on classifying the risk of dust impacts from a site as a basis for the identification of mitigation that is commensurate with such risk.

4 METHODOLOGY

4.1 Assessment Approach

This air quality assessment has been produced using the information available and procedures as follows:

I. review HDC's air quality monitoring data [18] and Defra's background maps [24] to establish baseline air quality and identify the main pollution sources in the area and compare with the UK air quality objectives;
II. consider the local environment to identify potentially sensitive receptors, both existing and proposed, that could be affected by changes in air quality as a result of the construction and operation of the proposed development;
III. assess qualitatively the potential dust and air quality impacts of the construction activities and control measures considered necessary during these activities, in line with IAQM guidance [23];
IV. screen the requirement to undertake detailed assessment of operational traffic and energy plant;
V. dispersion modelling using ADMS-Roads to predict the likely concentrations of NO_2 , PM_{10} and $PM_{2.5}$ at the development site and nearby sensitive receptors in line with Defra LAQM-TG22 guidance [25];
VI. comparison of the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations with the UK air quality objectives and the EPUK/IAQM significance criteria [22];
VII. calculate the estimated damage cost caused by NO_X and $PM_{2.5}$ from the proposed development in accordance with the 'Air quality and emissions mitigation guidance for Sussex' [21];
VIII. identify and recommend relevant mitigation options to reduce the potential impacts from the proposed development and, if necessary, to meet relevant planning and environmental requirements; and
IX. assumptions on construction and operational phases based on project experience and discussions with the design team.

4.2 Screening Criteria

The assessment follows the procedure as defined in the IAQM/EPUK guidance document for '*Land-use Planning & Development Control: Planning for Air Quality*'.

The IAQM/EPUK guidance provides criteria for establishing whether a development will require an air quality assessment. Stage 1 criteria are designed to screen out smaller developments and developments where air quality impacts can be considered to have insignificant effects. The criteria are set out in a two-stage approach:

In order to meet the criteria in Stage 1, the development must have:

- 10 or more residential units or a site area of more than 0.5 ha; or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

This must be combined with any of the following:

- more than 10 parking spaces within the development; or
- the development has a centralised energy facility or combustion process.

4.3 Construction Dust Screening

The IAQM document '*Guidance on the assessment of dust from demolition and construction'*, provides criteria for establishing whether a development will require a construction dust assessment. The guidance indicates that an assessment is required if there is a human receptor within 250 m of the boundary of the site or 50 m of the trackout route (up to 250 m from site entrance) or if there is an ecological receptor within 50 m of the boundary of the site or track out routes (up to 250 m from site entrance).

4.4 Construction and Operational Traffic Screening

The EPUK/IAQM guidance provides criteria for establishing whether a development will require a construction or operational traffic detailed assessment. The guidance indicates that an assessment of traffic emissions is only likely to be required for sites that will generate an additional annual average daily traffic (AADT) of greater than 100 LDVs and 25 HDVs within an AQMA.

4.5 Operational Energy Plant Screening

The EPUK/IAQM guidance for new development provides criteria for establishing whether a development will require an energy plant assessment during the operational phase. The guidance indicates that, typically a detailed modelling assessment of the proposed onsite energy plant is unlikely to be required where the single or combined NO_X emission rate less than 5 mg/s [1]. This is also dependent on the location and height of associated flues.

4.6 Basement Carpark Screening

The EPUK/IAQM guidance for new development provides criteria for establishing whether a development will require a basement carpark assessment during the operational phase. The guidance indicates that, typically a detailed modelling assessment of the carpark is required where there is an underground carpark with an extraction systems that meets the following criteria of ventilation extract within 20 m of a receptor coupled with 100 vehicle movements per day (total in and out).

4.7 Residential Suitability

The assessment has considered whether proposals will introduce residential receptors into an existing area of poor air quality. Baseline concentrations have been considered for sensitive receptors introduced by the proposed development and compared against national air quality objectives for NO_2, PM_{10} and $PM_{2.5}$.

[1] As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30 kW CHP unit operating at <95mg/Nm^3.

5 BASELINE CONDITIONS

5.1 Local Authority

HDC conducts air quality monitoring at various locations within the borough as part of its LAQM duties. Two AQMAs were declared in the district in the village of Cowfold and town centre of Storrington, in 2011 and 2010 respectively, on the basis that the annual mean nitrogen dioxide (NO_2) concentrations would not meet the national AQO. The proposed development is not located within or adjacent to an AQMA.

It can be seen from the 2024 HDC ASR that from 2019 to 2023, across the continuous and non-automatic monitoring stations within the district, there has been an overall decreasing trend in NO_2 concentrations. Across continuous monitoring stations, PM_{10} and $PM_{2.5}$ concentrations have remained low and relatively stable.

Automatic Monitoring

The closest automatic monitoring station to the proposed development site is located over 1.2 km away and would not be representative of site conditions. Therefore, automatic stations have been screened out of this assessment.

Diffusion Tube Sites

HDC also conducts NO_2 monitoring using passive diffusion tubes. Monitoring data between 2019 and 2023 for NO_2 diffusion tubes within 1 km of the site boundary, are presented in Table 5.1.

All monitoring locations were below the AQO of 40 µg/m³ for mean annual NO_2 in all reported years.

The most indicative monitoring locations are Site IDs 48 and 8, that are located within a part industrial part residential area, similar to that of the site.

Defra guidance, LAQM TG-(22) [25] states that when the annual mean NO_2 concentration at diffusion tube locations is less than 60 µg/m³, the short term (1-hour) objective NO_2, is unlikely to be exceeded. Annual mean NO_2 concentrations were below 60 µg/m³ at all locations presented in Table 5.1.

Table 5.1: Diffusion Tube Monitoring Annual Mean NO_2 Concentrations (µg/m³)

Site ID	Site Name	Distance to site (km)	Type	2019	2020	2021	2022	2023
48	Horsham 9N.1	600	Roadside	26.5	22.1	23.3	24.1	20.3
8	Horsham 5N	690	Roadside	25.2	21.0	22.7	21.6	20.4
10	Horsham 7N	770	Roadside	23.0	18.6	19.4	18.9	16.6
9	Horsham 6N	980	Roadside	21.5	18.2	19.5	17.6	15.0

5.2 Defra Background Maps

Defra predicted background pollutant concentrations are available for 1 km^2 grid squares across the UK . Concentrations of NO_2, PM_{10} and $PM_{2.5}$ are summarised in Table 5.2 for the grid square centred on 517500 , 131500, which is the closest representative to the proposed development site. NO_2, PM_{10} and $PM_{2.5}$ background concentrations are well within the AQOs in 2023 (baseline year), 2025 (present year) and 2027 (opening year).

Table 5.2: Predicted Defra Background Pollutant Concentrations (µg/m³)

Pollutant	Annual Mean Concentration (µg/m³)		
	2023	2025	2027
NO_2	10.7	10.1	9.5
PM_{10}	11.0	10.9	10.7
$PM_{2.5}$	7.1	6.9	6.8

5.3 Summary of Baseline Conditions

Annual mean NO_2 concentrations measured at the nearest diffusion tube monitoring locations to the proposed development were below the AQO between 2019 and 2023. NO_2 annual mean concentrations were decreasing each year, on average, between 2019 and 2023. This trend has been reported across the area by the HDC.

Defra predicted background pollutant concentrations shows that monitored NO_2, PM_{10} and $PM_{2.5}$ concentrations are low in 2023, 2025 and expected to reduce further in the opening year, 2027. These pollutants are below their respective AQOs.

Overall, 2025 baseline data show that NO_2 AQOs are expected to be met at the proposed development site. NO_2 annual mean concentrations are expected to decrease in the future as the number of newer, cleaner technologies increase on the road network. Defra predicted background pollutant concentrations show that NO_2, PM_{10} and $PM_{2.5}$ concentrations surrounding the site are expected to be low and below the AQOs.

6 CONSTRUCTION IMPACTS

6.1 Construction Dust

In line with IAQM guidance an assessment of construction dust is required as there are human receptors within 20 m of the site and 20 m of the construction vehicle route (up to 250 m from site entrance). There are no ecological receptors within 50 m of the construction vehicle route (up to 250 m from site entrance).

The assessment follows the IAQM guidance and has been used to identify appropriate mitigation measures proportionate to the level of risk, to reduce the effects such that they are not significant.

The assessment of human health and dust soiling is reported in Section 6.3.

6.2 Construction Traffic

There are likely to be less than 25 no. construction heavy duty vehicle (HDV) movements to and from the site per day during the construction period. Therefore, the additional AADT would be below the EPUK/IAQM screening criterion of 25 HGVs within an AQMA. Impacts from construction traffic will therefore be negligible and are not considered further in this assessment.

6.3 Magnitude of Dust Emissions

The dust emissions magnitude, area sensitivity and dust risk category were established in accordance with the IAQM guidance.

Demolition

The estimated quantity of materials to be demolished is between 12,000 – 75,000 m^3. Primary materials to be demolished are expected to consist of concrete and rebar. Demolition materials will be stockpiled on site to be crushed and reused, where possible. There will be onsite crushing and screening taking place. The site is considered to have a 'Large' dust emission magnitude for demolition.

Earthworks

The approximate site area undergoing excavation is between 18,000 m^2 and 110,000 m^2. Material to be excavated includes Upper Tunbridge Wells Sand (sandstone and mudstone) [26]. It is anticipated there will be fewer than 10 heavy earth moving vehicles active on site at any one time. There may be stockpiling up to 3 m in height. The site is considered to have a "Medium" dust emission magnitude for earthworks.

Construction

The construction phase will consist of the erection of 206 units with parking spaces and associated infrastructure. The total building volume to be constructed is expected to be between 12,000 m^3 and 75,000 m^3. The construction will consist of varying materials. There is no onsite concrete batching and/or sandblasting expected. The site is considered to have a “Medium” dust emission magnitude for construction.

Trackout

The peak number of HDV outward movements per day is predicted to be less than 25. Unpaved road lengths may be up to 100 m with mudstone and sandstone picked up. The site is considered to have a “Medium” dust emission magnitude for trackout.

The dust emission magnitudes are summarised below in Table 6.1.

Table 6.1: Dust Emission Magnitude Summary

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

6.4 Sensitivity of the Area

Nearby receptors are predominantly residential properties which have a high sensitivity to both dust soiling and human health impacts.

There are between 1 and 10 receptors with a high sensitivity to dust soiling and human health impacts within 20 m of the site boundary.

There are over 100 receptors with a high sensitivity to dust soiling and human health impacts within 20 m of the trackout route.

The sensitivity of the area to dust soiling is assessed as ‘Medium’ for demolition, earthworks and construction activities and a ‘High’ for trackout activities. The sensitivity of the area to human health is assessed as ‘Low’ due to the number and proximity of sensitive receptors and a background annual mean PM_{10} concentration less than 24 μg/m^3 in the vicinity of the site. The sensitivity of the area is summarised in Table 6.2.

Table 6.2: Sensitivity of the area Summary

Sensitivity of the Area	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	High
Human Health	Low	Low	Low	Low

6.5 Dust Risk

The likely risk of dust effects, based on the contents of Tables 6.1 and 6.2, at nearby sensitive receptors without mitigation in place is summarised in Table 6.3. There is a 'Large' risk from demolition and 'Medium' risk from all other activities causing dust soiling. There is 'Medium' risk to demolition and a 'Low' risk for all other activities in relation to human health effects.

Table 6.3: Dust Risk Category Summary

Summary	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	Medium	Medium	Medium
Human Health	Medium	Low	Low	Low

Under best-practice guidance, the proposed development constitutes a 'High' risk. Based on the results of the dust risk assessment, appropriate best-practice construction dust mitigation measures commensurate to the level of risk have been identified in accordance with the IAQM guidance and are presented in Section 8.

With appropriate mitigation in place, in line with best-practice guidance, any dust effects can be minimised, and residual dust effects can be considered to be not significant.

7 OPERATIONAL IMPACTS

7.1 Screening

The proposed development includes the construction of 206 residential units combined with 240 car parking spaces, plus 12 blue badge spaces. The assessment exceeds the stage 1 screening criteria outlined in Section 4.2, and therefore further assessment has been taken into consideration below.

7.2 Vehicle Emissions

The Transport Consultants, Paul Basham Associates, have detailed that there will be 1,125 AADT produced by the proposed development. This will include 1103 LDV and 22 HDV. The number of LDV exceeds the EPUK-IAQM threshold of 500 LDV movements outside an AQMA. Therefore, detailed dispersion modelling has been undertaken to determine the impact on the neighbouring community.

7.3 Onsite Energy Generation Emissions

The M&E consultants, Waterstone Design, have confirmed, in their assessment [27], that the development will incorporate a combination of Air to Water Air Source Heat pumps, for the houses, and Exhaust Air Heat Pumps, for the apartments.

The development will not produce any NO_X emissions and therefore onsite energy generation is expected to be non-significant and screened out of further assessment.

7.4 Basement Carpark Screening

The development has an existing underground carpark within the heritage building to the southeast of the site that will be hybrid mechanically ventilated via louvres. The architect drawings show that the louvres will be located within 20 m of relevant onsite receptors at the existing building and the transport consultants have confirmed that there will be 197 vehicle movements per day. Therefore, further detailed modelling has been undertaken to ensure that the louvres do not negatively impact onsite receptors around the building.

7.5 Railways Emissions

The site is bounded by a railway line to the northeastern boundary that runs between Warnham and Horsham. There are also several sidings neighbouring Nightingale Road, approximately 280 m from the site boundary. GWR St Phillip's Marsh Depot. Defra guidance, LAQM TG-(22), details rail lines with a heavy traffic of diesel passenger trains that should be taken into consideration. The train line is not identified within the guidance.

Additionally, HDC monitoring data in the area, see section 5, shows that NO_2 concentrations in the area are expected to be below 25 µg/m^3, below the LAQM TG-(22) screening criteria. Based on this assessment, screening criteria has not been met and the train line does not require further assessment.

7.6 Receptors

The proposed development will introduce new residential receptors. Baseline conditions, as presented in Section 5, indicate that NO_2, PM_{10} and $PM_{2.5}$ air quality objectives are currently being met and are expected to be met by the opening year, 2027.

However, the proposed development has a high trip generation which may create poor air quality within the area. Therefore, existing and proposed receptors have been evaluated within the dispersion modelling assessment. The receptor locations are detailed in Table 7.1.

Table 7.1: Assessment receptors

Receptor ID	Description	Coordinates		Height (m)
		X	Y	
E01	75 N Parade	517204	131868	1.5
E02	Delancey Court	517294	131711	1.5
E03	21 N Parade	517261	131556	1.5
E04	Ravencroft Court	517229	131378	1.5
E05	11 Wimblehurst Road	517412	131752	1.5
E06	26 Wimblehurst Road	517576	131838	1.5
E07	2 N Heath Lane	517763	131954	1.5
E08	7 N Heath Lane	517868	132067	1.5
E09	134 Parsonage Road	517911	131852	1.5
E10	54 Parsonage Road	518144	131778	1.5
E11	21 Parsonage Road	518344	131703	1.5
P01	Onsite Receptor (House)	517680	131896	1.5
P02	Onsite Receptor (House)	517747	131863	1.5
P03	Onsite Receptor (House)	517788	131810	1.5
P04	Onsite Receptor (Apartment, South)	517838	131725	1.5 – 10.5
P05	Onsite Receptor (Apartment, South)	517812	131745	1.5 – 10.5
P06	Onsite Receptor (Apartment, East)	517835	131747	1.5 – 10.5
P07	Onsite Receptor (Apartment, East)	517828	131775	1.5 – 10.5
P08	Onsite Receptor (Apartment, East)	517852	131807	1.5 – 10.5
P09	Onsite Receptor (Apartment, East)	517879	131805	1.5 – 10.5
P10	Onsite Receptor (Apartment, East)	517887	131777	1.5 – 10.5
P11	Onsite Receptor (Apartment, East)	517863	131746	1.5 – 10.5
P12	Onsite Receptor (Apartment, North)	517876	131830	1.5 – 10.5
P13	Onsite Receptor (Apartment, North)	517904	131809	1.5 – 10.5

7.7 Modelling Results

The long-term modelled annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations for all scenarios are presented in Tables 7.2 to Table 7.4. Percentage changes relative to the AQO, between the 2027 with and without development scenarios, were assessed against the EPUK/IAQM impact descriptor matrix as presented in Appendix D.

The results presented Tables 7.2 to 7.4 indicate that predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations, at all receptors locations modelled, are within their respective annual AQO for all scenarios modelled.

<u>NO_2</u>

The maximum percentage change in NO_2 contribution from the proposed development is 2.1% at the assessed receptors in 2027. Predicted impacts using IAQM/EPUK criteria are 'Negligible' at all receptors and effects are not significant.

LAQM-TG22 states that, when the annual mean NO_2 concentrations are less than 60 μgm^{-3}, the short-term (one-hour) objective for NO_2, is unlikely to be exceeded. Therefore, all assessment receptors are expected to meet the short-term objective.

<u>PM_{10}</u>

The maximum percentage change in PM_{10} contribution from the proposed development is 0.4% at the assessed receptors in 2027. Predicted impacts using IAQM/EPUK criteria are 'Negligible' at all receptors and effects are not significant in all scenarios.

Annual mean PM_{10} concentrations range from 10.8 $\mu g/m^3$ to 12.2 $\mu g/m^3$ over the scenarios modelled. Based on these figures, the 24-hour mean PM_{10} AQO is unlikely to be exceeded for any scenario.

<u>$PM_{2.5}$</u>

The maximum percentage change in $PM_{2.5}$ contribution from the proposed development is less than 0.7% at the assessed receptors in 2027. Predicted impacts using IAQM/EPUK criteria are 'Negligible' at all receptors and effects are not significant in all scenarios.

Table 7.2: Annual Mean NO_2 Concentrations

Receptor ID	Annual Mean NO_2 Concentration ($\mu g/m^3$)		% Change Relative to AQAL (40 $\mu g/m^3$)	Impact Descriptor
	2027 Without Development	2027 With Development		
E01	10.7	10.7	0.0	Negligible
E02	12.5	12.5	0.1	Negligible
E03	11.4	11.4	0.1	Negligible
E04	11.3	11.4	0.1	Negligible
E05	12.8	12.9	0.3	Negligible

Receptor ID	Annual Mean NO_2 Concentration (µg/m^3)		% Change Relative to AQAL (40 µg/m^3)	Impact Descriptor
	2027 Without Development	2027 With Development		
E06	11.8	11.9	0.2	Negligible
E07	12.6	12.8	0.3	Negligible
E08	10.6	10.7	0.2	Negligible
E09	11.3	11.4	0.3	Negligible
E10	12.3	12.3	0.1	Negligible
E11	10.7	10.8	0.0	Negligible
P01	11.6	11.7	0.4	Negligible
P02	10.1	10.5	1.0	Negligible
P03	9.8	9.9	0.3	Negligible
P04_0	9.7	9.8	0.3	Negligible
P04_1	9.7	9.8	0.2	Negligible
P04_2	9.7	9.7	0.2	Negligible
P04_3	9.7	9.7	0.1	Negligible
P05_0	9.7	9.8	0.4	Negligible
P05_1	9.7	9.8	0.3	Negligible
P05_2	9.7	9.8	0.2	Negligible
P05_3	9.7	9.7	0.1	Negligible
P06_0	9.7	10.2	1.2	Negligible
P06_1	9.7	9.9	0.5	Negligible
P06_2	9.7	9.8	0.2	Negligible
P06_3	9.7	9.7	0.1	Negligible
P07_0	9.7	10.6	2.1	Negligible
P07_1	9.7	10.0	0.6	Negligible
P07_2	9.7	9.8	0.2	Negligible
P07_3	9.7	9.8	0.1	Negligible
P08_0	9.8	10.7	2.1	Negligible
P08_1	9.8	10.1	0.7	Negligible
P08_2	9.8	9.9	0.3	Negligible
P08_3	9.7	9.8	0.2	Negligible
P09_0	9.8	10.8	2.3	Negligible
P09_1	9.8	10.2	0.9	Negligible
P09_2	9.8	10.0	0.4	Negligible
P09_3	9.7	9.8	0.2	Negligible
P10_0	9.8	10.3	1.5	Negligible

Receptor ID	Annual Mean NO_2 Concentration (µg/m^3)		% Change Relative to AQAL (40 µg/m^3)	Impact Descriptor
	2027 Without Development	2027 With Development		
P10_1	9.7	10.0	0.6	Negligible
P10_2	9.7	9.8	0.3	Negligible
P10_3	9.7	9.8	0.2	Negligible
P11_0	9.7	10.3	1.5	Negligible
P11_1	9.7	10.0	0.7	Negligible
P11_2	9.7	9.8	0.2	Negligible
P11_3	9.7	9.7	0.1	Negligible
P12_0	10.1	10.3	0.5	Negligible
P12_1	10.0	10.2	0.5	Negligible
P12_2	9.9	10.0	0.3	Negligible
P12_3	9.8	9.9	0.2	Negligible
P13_0	9.9	10.2	0.6	Negligible
P13_1	9.9	10.1	0.5	Negligible
P13_2	9.8	9.9	0.3	Negligible
P13_3	9.7	9.8	0.2	Negligible

Table 7.3: Annual Mean PM_{10} Concentrations

Receptor ID	Annual Mean PM_{10} Concentration (µg/m^3)		% Change Relative to AQAL (40 µg/m^3)	Impact Descriptor
	2027 Without Development	2027 With Development		
E01	11.2	11.2	0.0	Negligible
E02	11.9	11.9	0.1	Negligible
E03	11.5	11.6	0.0	Negligible
E04	11.5	11.5	0.0	Negligible
E05	12.2	12.2	0.1	Negligible
E06	11.7	11.8	0.1	Negligible
E07	12.0	12.1	0.1	Negligible
E08	11.8	11.8	0.1	Negligible
E09	11.5	11.5	0.1	Negligible
E10	12.0	12.0	0.0	Negligible
E11	11.3	11.3	0.0	Negligible

Receptor ID	Annual Mean PM_{10} Concentration (µg/m^3)		% Change Relative to AQAL (40 µg/m^3)	Impact Descriptor
	2027 Without Development	2027 With Development		
P01	11.6	11.6	0.2	Negligible
P02	10.9	11.1	0.4	Negligible
P03	10.8	10.8	0.1	Negligible
P04_0	10.8	10.8	0.0	Negligible
P04_1	10.8	10.8	0.0	Negligible
P04_2	10.8	10.8	0.0	Negligible
P04_3	10.8	10.8	0.0	Negligible
P05_0	10.8	10.8	0.0	Negligible
P05_1	10.8	10.8	0.0	Negligible
P05_2	10.8	10.8	0.0	Negligible
P05_3	10.8	10.8	0.0	Negligible
P06_0	10.8	10.8	0.1	Negligible
P06_1	10.8	10.8	0.0	Negligible
P06_2	10.8	10.8	0.0	Negligible
P06_3	10.8	10.8	0.0	Negligible
P07_0	10.8	10.8	0.1	Negligible
P07_1	10.8	10.8	0.0	Negligible
P07_2	10.8	10.8	0.0	Negligible
P07_3	10.8	10.8	0.0	Negligible
P08_0	10.8	10.9	0.1	Negligible
P08_1	10.8	10.8	0.1	Negligible
P08_2	10.8	10.8	0.0	Negligible
P08_3	10.8	10.8	0.0	Negligible
P09_0	10.8	10.9	0.2	Negligible
P09_1	10.8	10.9	0.1	Negligible
P09_2	10.8	10.8	0.0	Negligible
P09_3	10.8	10.8	0.0	Negligible
P10_0	10.8	10.8	0.1	Negligible
P10_1	10.8	10.8	0.0	Negligible
P10_2	10.8	10.8	0.0	Negligible
P10_3	10.8	10.8	0.0	Negligible
P11_0	10.8	10.8	0.1	Negligible
P11_1	10.8	10.8	0.0	Negligible
P11_2	10.8	10.8	0.0	Negligible

Receptor ID	Annual Mean PM_{10} Concentration (µg/m^3)		% Change Relative to AQAL (40 µg/m^3)	Impact Descriptor
	2027 Without Development	2027 With Development		
P11_3	10.8	10.8	0.0	Negligible
P12_0	10.9	11.0	0.1	Negligible
P12_1	10.9	10.9	0.0	Negligible
P12_2	10.8	10.9	0.0	Negligible
P12_3	10.8	10.8	0.0	Negligible
P13_0	10.9	10.9	0.1	Negligible
P13_1	10.8	10.9	0.0	Negligible
P13_2	10.8	10.8	0.0	Negligible
P13_3	10.8	10.8	0.0	Negligible

Table 7.4: Annual Mean $PM_{2.5}$ Concentrations

Receptor ID	Annual Mean PM_{10} Concentration (µg/m^3)		% Change Relative to AQAL (12 µg/m^3)	Impact Descriptor
	2027 Without Development	2027 With Development		
E01	7.1	7.1	0.0	Negligible
E02	7.4	7.4	0.1	Negligible
E03	7.2	7.2	0.1	Negligible
E04	7.2	7.2	0.1	Negligible
E05	7.6	7.6	0.3	Negligible
E06	7.3	7.4	0.2	Negligible
E07	7.5	7.5	0.3	Negligible
E08	7.3	7.3	0.2	Negligible
E09	7.2	7.2	0.1	Negligible
E10	7.5	7.5	0.1	Negligible
E11	7.1	7.1	0.0	Negligible
P01	7.3	7.3	0.3	Negligible
P02	6.9	7.0	0.7	Negligible
P03	6.9	6.9	0.2	Negligible
P04_0	6.8	6.8	0.1	Negligible
P04_1	6.8	6.8	0.1	Negligible
P04_2	6.8	6.8	0.0	Negligible

Receptor ID	Annual Mean PM_{10} Concentration (µg/m^3)		% Change Relative to AQAL (12 µg/m^3)	Impact Descriptor
	2027 Without Development	2027 With Development		
P04_3	6.8	6.8	0.0	Negligible
P05_0	6.8	6.8	0.1	Negligible
P05_1	6.8	6.8	0.1	Negligible
P05_2	6.8	6.8	0.0	Negligible
P05_3	6.8	6.8	0.0	Negligible
P06_0	6.8	6.9	0.2	Negligible
P06_1	6.8	6.8	0.1	Negligible
P06_2	6.8	6.8	0.1	Negligible
P06_3	6.8	6.8	0.0	Negligible
P07_0	6.8	6.9	0.4	Negligible
P07_1	6.8	6.9	0.1	Negligible
P07_2	6.8	6.8	0.1	Negligible
P07_3	6.8	6.8	0.0	Negligible
P08_0	6.9	6.9	0.5	Negligible
P08_1	6.9	6.9	0.2	Negligible
P08_2	6.9	6.9	0.1	Negligible
P08_3	6.8	6.8	0.1	Negligible
P09_0	6.9	6.9	0.5	Negligible
P09_1	6.9	6.9	0.2	Negligible
P09_2	6.9	6.9	0.1	Negligible
P09_3	6.8	6.8	0.1	Negligible
P10_0	6.8	6.9	0.3	Negligible
P10_1	6.8	6.9	0.1	Negligible
P10_2	6.8	6.8	0.1	Negligible
P10_3	6.8	6.8	0.0	Negligible
P11_0	6.8	6.9	0.3	Negligible
P11_1	6.8	6.8	0.2	Negligible
P11_2	6.8	6.8	0.1	Negligible
P11_3	6.8	6.8	0.0	Negligible
P12_0	6.9	6.9	0.1	Negligible
P12_1	6.9	6.9	0.1	Negligible
P12_2	6.9	6.9	0.1	Negligible
P12_3	6.8	6.9	0.1	Negligible
P13_0	6.9	6.9	0.1	Negligible

Receptor ID	Annual Mean PM_{10} Concentration (µg/m³)		% Change Relative to AQAL (12 µg/m³)	Impact Descriptor
	2027 Without Development	2027 With Development		
P13_1	6.9	6.9	0.1	Negligible
P13_2	6.9	6.9	0.1	Negligible
P13_3	6.8	6.9	0.1	Negligible

8 EMISSIONS MITIGATION ASSESSMENT

In line with Sussex Air Quality Partnership's guidance [21], emissions were calculated using Defra's EFT (version 13) [281.2929] for the trips to be generated by the proposed development, and the five-year 'damage cost value' was calculated using Defra's latest Damage Cost Appraisal Toolkit [29]. NO_X and $PM_{2.5}$ have been assessed in line with the Sussex guidance.

<u>Emission Factor Toolkit Input</u>

The trip rate (vehicle trips per day) for the development was provided by Paul Basham Associated that concluded there would be 1,125 trips produced by the proposed development with 2% HDVs. The selected area is 'England (not London)' and the selected road type is 'Urban (Not London)'. Inputs of speed and link length are selected as per the Sussex guidance.

<u>Damage Cost Appraisal Toolkit Input</u>

The length of the appraisal period is five years, starting in 2025 and ending in 2029. The selected pollutant sector is 'Road Transport Urban Medium' for both NO_X and $PM_{2.5}$. The central present value outputs for both pollutants are presented for the appraisal period and are added together to calculate the total five-year damage cost value is presented.

<u>Damage Cost</u>

The five-year air quality damage cost of the development was calculated to be [redacted] The calculation of the five-year damage cost is presented below in Table 8.1.

The five-year damage cost represents the minimum sum of money that must be spent on the implementation of practical mitigation measures to aid in off-setting adverse air quality impacts from the development, in line with the Sussex guidance.

Table 8.1: Five-Year Air Quality Damage Cost Calculation

Trip Rate for Development (vehicle trips per day)		**1,125**	
Pollutant		NO_X	$PM_{2.5}$
Emissions (tonnes/annum)	2025	0.2070	0.0212
	2026	0.1828	0.0209
	2027	0.1604	0.0206
	2028	0.1395	0.0205
	2029	0.1204	0.0203
Five-year (Central Present Value) Damage Cost (£)		7,525	6,740
Five-year Damage Cost NO_X + $PM_{2.5}$ (£)		**14,265**	

9 MITIGATION AND CONTROL

9.1 Construction

The construction activities associated with the proposed development are predicted to have, at worst, a 'Medium' risk for dust soiling and for health effects.

Impacts associated with the proposed development are likely to be in the form of dust generated primarily during construction phase activities. The use of appropriate mitigation measures throughout the construction phase will ensure that impacts are minimised or removed, where possible.

Based on the results of the dust risk assessment, it is recommended that the following general best-practice measures taken from IAQM guidance be adopted, as detailed in Table 8.1.

Table 8.1: Recommended Mitigation Measures- Construction Phase

Management Category	Mitigation Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundaries. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan, which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real time PM_{10} continuous monitoring and/or visual inspections.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
	Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces

Management Category	Mitigation Measure
	such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
Preparing and maintaining the site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle / machinery and sustainable travel	Ensure all on-road vehicles comply with the relevant Emission requirements and NRMM standards, where applicable.
	Ensure all vehicles switch off engines when stationary – no idling vehicles.
	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
	Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Management Category	Mitigation Measure
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management	Avoid bonfires and burning of waste materials.
Measures Specific to Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
	Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
	Avoid explosive blasting, using appropriate manual or mechanical alternatives.
	Bag and remove any biological debris or damp down such material before demolition.
Measures Specific to Earthworks	RE-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. (Desirable)
	Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. (Desirable)
	Only remove the cover in small areas during work and not all at once. (Desirable)
Measures Specific to Construction	Avoid scabbling (roughening of concrete surfaces) if possible. (Desirable)
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. (Desirable)
	For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. (Desirable)

Management Category	Mitigation Measure
Measures Specific to Trackout	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site logbook.
	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
	Access gates to be located at least 10 m from receptors where possible.

9.2 Operational

By 2027, the results show that NO_2, PM_{10} and $PM_{2.5}$ annual mean concentrations are expected to meet the AQOs within the proposed development.

The current proposal at the development includes the provision of Air to Water Air Source Heat Pumps and Exhaust Air Heat Pumps and bicycle parking facilities consisting of 220 bike spaces. This infrastructure will contribute to the cost presented in Section 8 of this report.

Based on this information, no further mitigation measures are required.

The assessment demonstrates that the operation of the proposed development will have negligible impacts on local air quality. No operational mitigation measures are therefore required to reduce air quality impacts.

9.3 New Receptors

By 2027, the results show that NO_2, PM_{10} and $PM_{2.5}$ annual mean concentrations are expected to meet the AQOs within the proposed development. The proposed development unlikely to introduce new receptors into an area of poor air quality. Therefore, no additional mitigation is required.

10 CONCLUSIONS

An assessment of the air quality impacts associated with the construction and operational phases of the proposed development is presented in this report.

The baseline assessment indicates that NO_2, PM_{10} and $PM_{2.5}$ AQOs are currently being met in the area around the development site and are expected to continue to be met. The proposed development is, therefore not expected to introduce new receptors into an area of poor air quality.

The results of the dust risk assessment indicate that construction activities, at worst, have a 'high' risk of dust soiling and 'medium' risk of human health effects from PM_{10}, at nearby receptors without mitigation. These impacts can be minimised through the implementation of appropriate mitigation measures. These mitigation measures have been identified in Section 8 of this report. With mitigation in place, residual dust effects from construction are likely to be minimal and are considered to be not significant, in line with IAQM guidance.

Air quality impacts from construction and operational traffic are expected to be negligible, due to the expected low number of vehicle movements during the construction. There is an expected negligible impact during operational phase of the proposed development, in accordance with the data reviewed in Section 7. The current air quality in the area indicates that the objectives for NO_2, PM_{10} and $PM_{2.5}$ are not expected to be exceeded for new receptors within the proposed development.

The proposed development is considered to comply with relevant national, regional and local planning policy and air quality does not present a constraint to the development proposals.

11 REFERENCES

1. Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe. Official Journal of the European Union. Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. 11.6.2008.
2. SI 2010 No. 1001. The Air Quality Standards (England) Regulations 2010. HMSO.
3. SI 2016 No. 1184. The Air Quality Standards (Amendment) Regulations 2016. HMSO.
4. Department for Environment, Food and Rural Affairs. 2017. Air Quality Plan for Nitrogen Dioxide (NO2) in UK (2017). [online] https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017#history.
5. SI 2000 No. 928. The Air Quality Regulations 2000. HMSO.
6. SI 2002 No. 3043. The Air Quality (England) (Amendment) Regulations 2002. HMSO.
7. Office of the Deputy Prime Minister. 1995. The Environment Act.
8. Office of the Deputy Prime Minister (2021). The Environment Act 2021. Available at https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted.
9. Office of the Deputy Prime Minister (2023). The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. Available at https://www.legislation.gov.uk/uksi/2023/96/introduction/made.
10. Department for Environment, Food and Rural Affairs. 2023. Air Quality Strategy 2023. [online] https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery.
11. 1990 c.43. Environmental Protection Act. HMSO.
12. 1993 c.11. Clean Air Act 1993. HMSO.
13. Ministry of Housing, Communities and Local Government. National Planning Policy Framework. December 2024.
14. Ministry of Housing, Communities and Local Government. 2019. Planning Practice Guidance: Air Quality. [online] https://www.gov.uk/guidance/air-quality--3.
15. SI 1927. The Conservation of Habitats and Species (Amendment) Regulation 2012.
16. Horsham District Council. 2015. Horsham District Planning Framework (excluding South Downs National Park).
17. Horsham District Council. 2020. New Local Plan: Proposed Submission Version.
18. Horsham District Council. 2024. Air Quality Annual Status Report 2023.
19. West Sussex County Council. 2020. Air Quality Action Plan: Breathing Better.
20. West Sussex County Council. 2023. Air Quality Action Plan: Breathing Better.
21. Sussex Air Quality Partnership. 2021. Air quality and emissions mitigation guidance for Sussex (2021).
22. Environmental Protection UK and Institute of Air Quality Management. 2017. Land-use Planning & Development Control: Planning for Air Quality. Institute of Air Quality Management & EPUK, London.
23. Institute of Air Quality Management. 2024. Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2).
24. Department for Environment, Food and Rural Affairs. 2024. Background Mapping Data for Local Authorities - 2021. [online] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021

25. Department for Environment, Food and Rural Affair. 2022. Local Air Quality Management Technical Guidance (TG-22).25.
26. UK Research and Innovation. 2024. Geology of Britain Viewer. Natural Environment Research Council. [online] http://mapapps.bgs.ac.uk/geologyofbritain/home.html.
27. Waterstone Design. 2025. Fromer Novartis Site, Parsonage Road, Horsham, Lovells Site (Phase 1&2) Sustainability and Energy Statement.
28. Department for Environment, Food and Rural Affairs. 2024. Emissions Factor Toolkit (version 13). [online] https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/.
29. Department for Environment, Food and Rural Affairs. 2023. Air quality appraisal: damage costs toolkit. [online]https://assets.publishing.service.gov.uk/media/6400aaa48fa8f527fe30db95/Air_Quality_Damage_Cost_Appraisal_Toolkit_February_2023.ods/preview.

Appendix A: Model Input

ADMS-Roads model parameters used in the assessment are shown in Table A1 below.

Table A1: Model Input Parameters

Parameter	Dispersion Site Value	Met. Site Value
Latitude (degrees)	51	-
Surface roughness length (m)	1	0.5
Minimum Monin-Obukhov length (m)	30	10
Surface Albedo (model default)	0.23	0.23
Priestley-Taylor parameter (model default)	1	1
Emission Year (all scenarios 2023 and 2027)	2023, 2027	-
EFT Road Type	Rural (not London), Urban (not London)	-
EFT Area	England (not London)	-

The meteorological data has been taken from Gatwick Airport for 2023. The wind rose for 2023 is detailed in Figure A1.

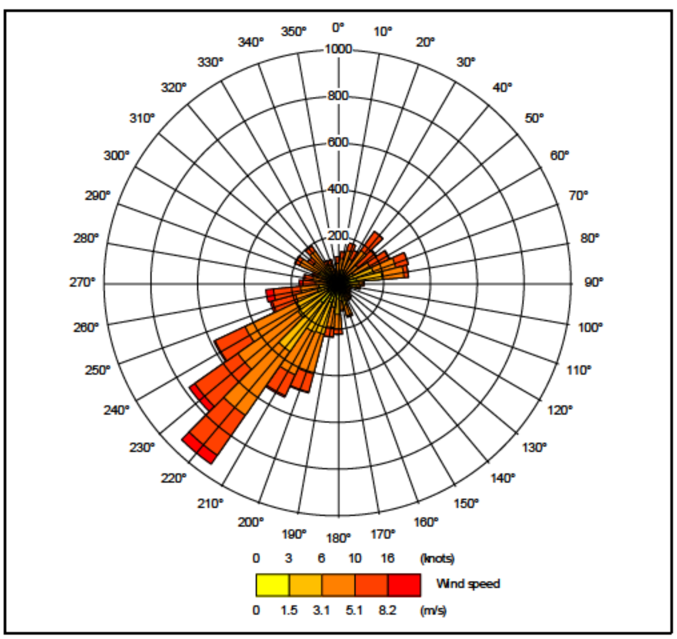


Figure A1: Gatwick Airport 2023 Windrose

Road Sources

The following roads were modelled. Road widths were measured from aerial maps. This information is presented in Table A2 and Figures A1 and A2.

Table A2: Modelled Road Links

Link ID	Description	Modelled Road Elevation (m)	Modelled Road Width (m)	Canyon Height (m)
Verification Model				
1_Jct1	Albion Way (A281) Southbound	0	9.0	0
1_Jct2	Albion Way (A281) Southbound	0	8.0	0
1_0	Albion Way (A281) Southbound	0	8.0	0
1_Jct3	Albion Way (A281) Southbound	0	8.0	0
1_Jct4	Albion Way (A281) Southbound	0	5.5	0
1_Jct5	Albion Way (A281) Southbound	0	8.0	0
1_1	Albion Way (A281) Southbound	0	8.0	0
1_2	Albion Way (A281) Southbound	0	7.0	0
1_Jct6	Albion Way (A281) Southbound	0	6.0	0
1_Jct7	Albion Way (A281) Southbound	0	6.0	0
2_Jct1	Albion Way (A281) Northbound	0	6.5	0
2_0	Albion Way (A281) Northbound	0	4.5	0
2_1	Albion Way (A281) Northbound	0	7.0	0
2_Jct2	Albion Way (A281) Northbound	0	8.0	0
2_Jct3	Albion Way (A281) Northbound	0	9.5	0
2_Jct4	Albion Way (A281) Northbound	0	10.0	0
2_2	Albion Way (A281) Northbound	0	7.5	0
2_Jct5	Albion Way (A281) Northbound	0	8.0	0
2_Jct6	Albion Way (A281) Northbound	0	9.5	0
3_Jct1	East Street (A281) Westbound	0	5.5	0
3_Jct2	East Street (A281) Westbound	0	3.5	0
4_Jct1	East Street (A281) Eastbound	0	5.5	0
4_0	East Street (A281) Eastbound	0	4.0	0
Future Year (Development) Models				
7_Jct1	Parsonage Road	0	12.0	0
7_0	Parsonage Road	0	9.0	0
7_1	Parsonage Road	0	10.5	0
7_2train	Parsonage Road	0	8.5	0
7_3	Parsonage Road	0	7.0	0
7_Jct2	Parsonage Road	0	11.5	0
7_Rnd1	Parsonage Road	0	5.0	0
7_Rnd2	Parsonage Road	0	5.0	0

Link ID	Description	Modelled Road Elevation (m)	Modelled Road Width (m)	Canyon Height (m)
7_4	Parsonage Road	0	12.0	0
7_5	Parsonage Road	0	7.0	0
7_6	Parsonage Road	0	12.0	0
6_Jct1	N Heath Lane	0	8.5	0
6_1	N Heath Lane	0	7.5	0
6_2school	N Heath Lane	0	7.0	0
2_Jct1	Wimblehurst Road	0	11.5	9
3_1	Wimblehurst Road	0	7.5	9
3_2	Wimblehurst Road	0	6.0	9
3_Jct1	Wimblehurst Road	0	8.0	0
4_1	North Parade (B2237)	0	7.5	9
4_Jct1	North Parade (B2237)	0	11.0	0
3_Jct2	Wimblehurst Road	0	16.0	0
5_Jct1	North Parade (B2237)	0	12.5	0
5_1	North Parade (B2237)	0	9.0	0
627_Rnd1	Parsonage Road, N Heath Lane and Wimblehurst Road Roundabout	0	7.5	0
627_Rnd2	Parsonage Road, N Heath Lane and Wimblehurst Road Roundabout	0	7.5	0
1_Jct	Site Entrance	0	11.0	0
1_1	Site Entrance	0	6.0	0

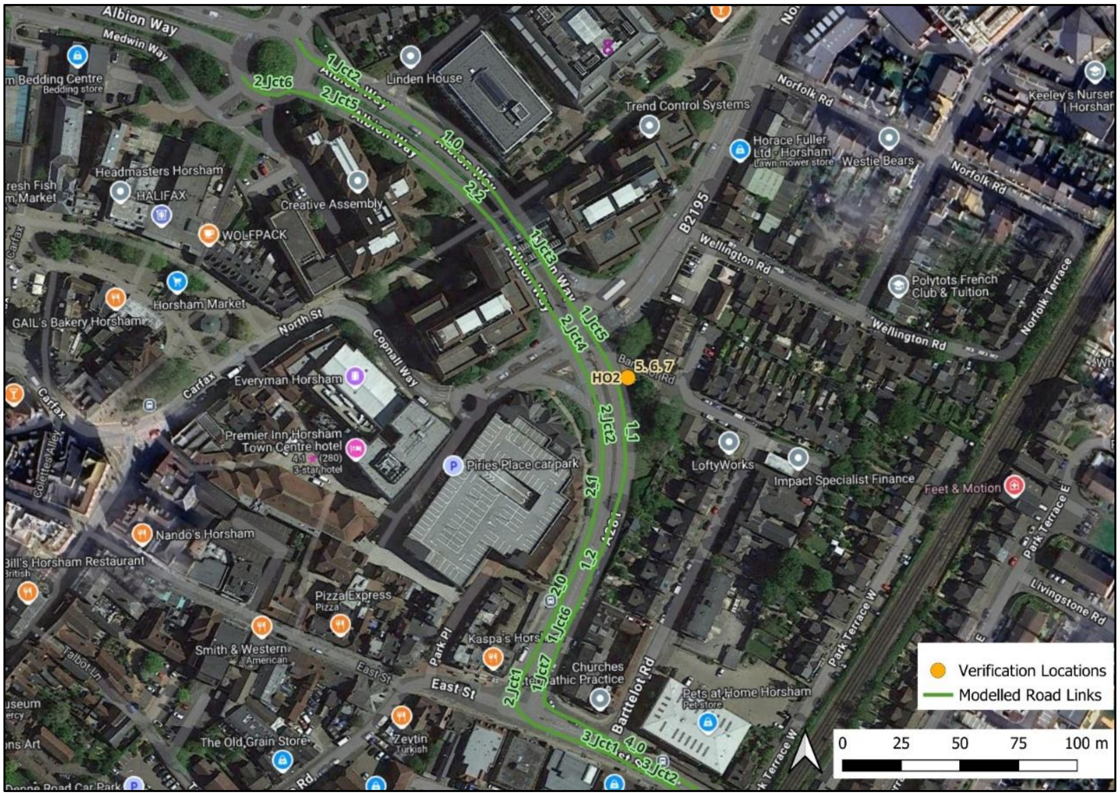


Figure A1: Road Links and Verification Locations Modelled

Figure A2: Road Links and Sensitive Receptors Modelled

Traffic Data

Major road links within at least 200 m of the development site and assessed receptors were modelled and the associated traffic data are presented in Table A3.

Minor roads were accounted for indirectly through background concentrations.

Road traffic data, including AADT flows, average speeds and HGV %, for all modelled scenarios, were provided by Paul Basham Associates. Where required (e.g. road junctions and roundabouts), average speeds and traffic flows were adjusted within the model in line with LAQM-TG22.

Time Varying Emission Factors

Hourly time varying emission factors were entered into the model using a '.fac' file to ensure that diurnal variation of the local traffic was taken into account for weekdays, Saturdays and Sundays.

Time varying emission factors used are based on national 2023 traffic flow data. The dataset was acquired from the Department of Transport: Road Traffic Statistics database.

Traffic data used in all modelled scenarios is detailed in Table A3.

Table A3: Traffic Data Used in the Assessment

Road ID	2023		2027		2027		Vehicle Speed (km/h)
	Verification		Without Development		With Development		
	Total AADT	HGV%	Total AADT	HGV%	Total AADT	HGV%	
Verification Model							
1_Jct1	11212	0.6	-	-	-	-	24.1
1_Jct2	11212	0.6	-	-	-	-	32.2
1_0	11212	0.6	-	-	-	-	48.3
1_Jct3	11212	0.6	-	-	-	-	24.1
1_Jct4	11212	0.6	-	-	-	-	8.0
1_Jct5	11212	0.6	-	-	-	-	24.1
1_1	11212	0.6	-	-	-	-	48.3
1_2	11212	0.6	-	-	-	-	48.3
1_Jct6	11212	0.6	-	-	-	-	32.2
1_Jct7	11212	0.6	-	-	-	-	16.1
2_Jct1	12577	1.6	-	-	-	-	24.1
2_0	12577	1.6	-	-	-	-	48.3
2_1	12577	1.6	-	-	-	-	48.3
2_Jct2	12577	1.6	-	-	-	-	24.1
2_Jct3	12577	1.6	-	-	-	-	8.0
2_Jct4	12577	1.6	-	-	-	-	24.1
2_2	12577	1.6	-	-	-	-	48.3

Road ID	2023 Verification		2027 Without Development		2027 With Development		Vehicle Speed (km/h)
	Total AADT	HGV%	Total AADT	HGV%	Total AADT	HGV%	
2_Jct5	12577	1.6	-	-	-	-	24.1
2_Jct6	12577	1.6	-	-	-	-	16.1
3_Jct1	5629	1.5	-	-	-	-	12.9
3_Jct2	5629	1.5	-	-	-	-	16.1
4_Jct1	5728	1.4	-	-	-	-	16.1
4_0	5728	1.4	-	-	-	-	32.2
Future Year (Development) Models							
7_Jct1	-	-	9428	2	9574	2	24.1
7_0	-	-	9428	2	9574	2	48.3
7_1	-	-	9428	2	9574	2	48.3
7_2train	-	-	9428	2	9574	2	24.1
7_3	-	-	9428	2	9574	2	48.3
7_Jct2	-	-	9428	2	9574	2	24.1
7_Rnd1	-	-	4714	2	4787	2	16.1
7_Rnd2	-	-	4714	2	4787	2	16.1
7_4	-	-	9428	2	9574	2	24.1
7_5	-	-	9428	2	9574	2	48.3
7_6	-	-	9428	2	9574	2	24.1
6_Jct1	-	-	11947	2	12431	2	24.1
6_1	-	-	11947	2	12431	2	48.3
6_2school	-	-	11947	2	12431	2	32.2
2_Jct1	-	-	15719	2	16349	2	24.1
3_1	-	-	12433	2	12928	2	48.3
3_2	-	-	12433	2	12928	2	48.3
3_Jct1	-	-	12433	2	12928	2	24.1
4_1	-	-	15495	2	15731	2	48.3
4_Jct1	-	-	15495	2	15731	2	16.1
3_Jct2	-	-	12433	2	12928	2	8.0
5_Jct1	-	-	16197	2	16464	2	16.1
5_1	-	-	16197	2	16464	2	48.3
627_Rnd1	-	-	18547	2	19177	2	16.1
627_Rnd2	-	-	18547	2	19177	2	16.1
1_Jct	-	-	9428	2	1125	2	16.1
1_1	-	-	9428	2	1125	2	24.1

Volume Source Inputs

The louvres within the basement car park have been modelled as volume sources within ADMS-Roads, to ensure the accumulative impact in conjunction with the roads is taken into consideration. The louvres modelled are depicted in Table A4 and Figure A3.

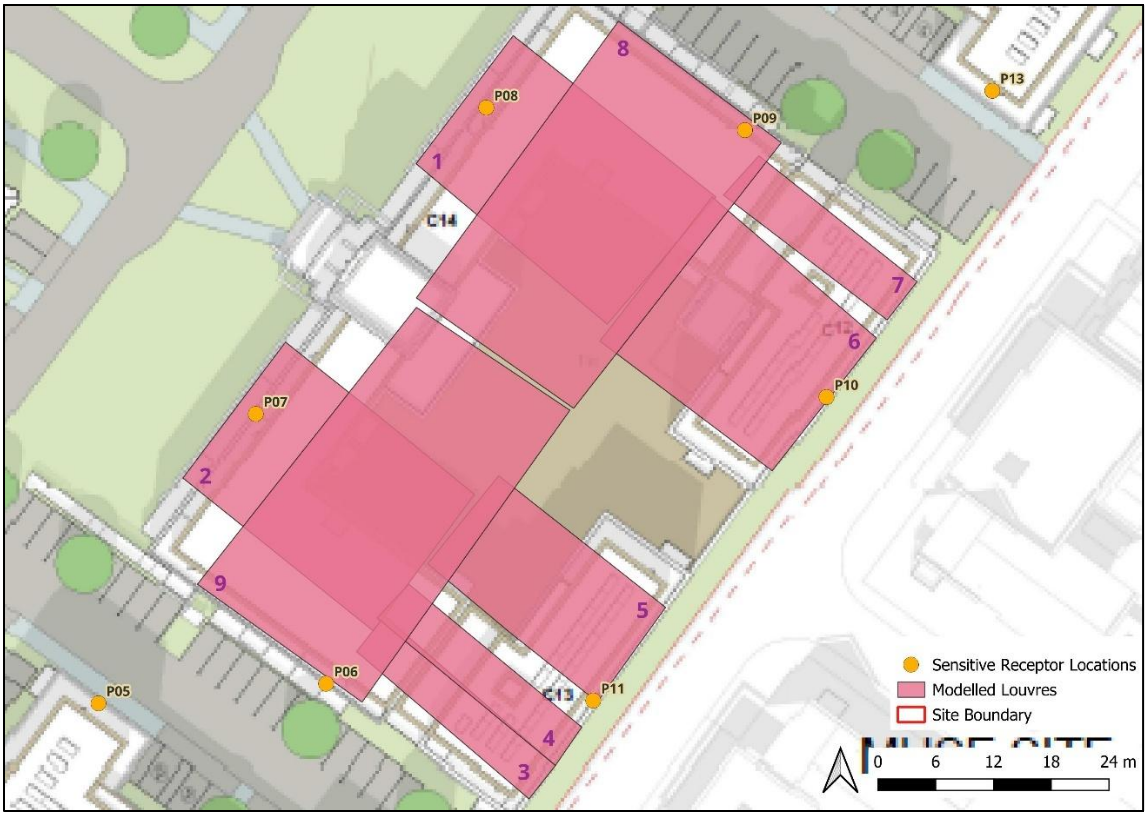
Emission rates for the louvres were calculated by taking the following sources of pollution into consideration:

- Number of vehicle movements per day (197 vehicles)
- Number of vehicles idling for 30 seconds (197 vehicles)
- Number of cold starts, estimated to be half the number of carpark users (99 vehicles)

Table A4: Modelled Volume Sources Inputs

Source ID	Height (m)	Width Depth (m)	Emission Rate (g/m³/s)		
			NO_X	PM_{10}	$PM_{2.5}$
1	0.51	1.02	2.01871e-07	6.05423e-09	6.05420e-09
2	0.51	1.02			
3	1.7475	1.625			
4	2.0925	4.185			
5	0.525	1.05			
6	0.4	0.8			
7	1.905	3.81			
8	0.31	0.62			
9	0.51	1.02			

Figure A3: Volume Source Inputs



Appendix B: **Model Verification**

Model verification for NO_2 has been conducted using the nearest diffusion tube site run by Horsham District Council (HDC). The monitored road contribution NO_x was calculated using Defra's latest NO_x to NO_2 calculator (version 9.1). Diffusion tube NO_2 data were taken from HDC's Air Quality ASR for 2023. Details are listed in Table C1 below.

Table C1: Diffusion Tube Data Used for Model Verification

Verification ID	X, Y Co-ordinates	Height Above Ground (m)	Distance to nearest Kerb (m)	Monitored NO_2 ($\mu g/m^3$)
HO2	517485, 130590	3.0	1.5	16.2
5.6.7	517489, 130580	2.8	1.5	17.0

Relevant Defra backgrounds for 2023 according to the locations were used in the model verification.

The same verification factor was used for the 2027 scenarios.

Modelled road contributions to NO_x were compared to monitored road contributions to NO_x. Monitored road NO_x contributions were calculated with Defra's NO_x to NO_2 calculator. Initial verification results are shown in Table C2 below. This shows that the model under-estimated road NO_x contributions at the verification sites, though overall the model predicted concentrations accurately.

Table C2: Comparison of Monitored and Modelled NOx And NO_2 Data

Site ID	Background NO_2 ($\mu g/m^3$)	Background NO_x ($\mu g/m^3$)	Monitored Total NO_2 ($\mu g/m^3$)	Monitored NO_2 Road Contribution ($\mu g/m^3$)	Monitored NO_x Road Contribution ($\mu g/m^3$)	Modelled NO_x Road Contribution ($\mu g/m^3$)	Ratio of Monitored Road Contribution NO_x: Modelled Road Contribution NO_x
HO2	10.65	14.00	16.20	5.5	11.93	7.38	1.62
5.6.7	10.65	14.00	17.00	6.3	13.74	7.85	1.75

A NO_x adjustment factor of 1.69 was applied to all modelled road NO_x concentrations. Defra's NO_x:NO_2 calculator was used to derive modelled NO_2 concentrations, using adjusted modelled road NO_x and background NO_2 concentrations.

The NO_x adjustment factors were applied to all modelled road contributions and all modelled scenarios for NO_x, PM_{10} and $PM_{2.5}$.

Appendix C: IAQM Significance Criteria

Impact descriptors for individual existing receptors is presented in Table D1 below. This is based on the IAQM guidance for new development.

Table D1: IAQM Significance Criteria

Annual mean concentrations at receptors in the assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

2. 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.

3. The Table is only designed to be used with annual mean concentrations.

4. Descriptors for individual receptors only; the overall significance is determined using professional judgement (see Chapter 7). 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.

5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

6. The total concentration categories reflect the degree of potential harm by reference to the AQAL 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 AQAL, 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 AQAL.

7. 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 AQAL. 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 AQAL, rather than being exactly equal to it.