Courthouse Farm, Copthorne
Residential Scheme

Air Quality Assessment

Courthouse Farm, Copthorne Residential Scheme

Air Quality Assessment

Revision	Date	Notes	Author	Checked	Approved
1.0	10-10-2025	E3948	EP	ND	Dr Nick Davey
1.1	24-10-2025	E3948	EP	ND	Dr Nick Davey

Entran Limited
2nd & 3rd Floors
Northgate House
Upper Borough Walls
Bath
BA1 1RG

T: 0117 937 4077
www.entranltd.co.uk

-

CONTENTS **PAGE**

1 INTRODUCTION

1.1 Entran Limited has been commissioned to undertake an assessment of air quality impacts associated with a proposed residential scheme consisting of 86 residential dwellings at Courthouse Farm, Copthorne (the 'Proposed Development'). A layout plan of the application site (the 'Site') is shown in Figure 1.1.

1.2 The Proposed Development lies within the administrative area of Mid Sussex District Council (MSDC). MSDC have not declared any Air Quality Management Areas (AQMAs) in the district. As such, the Proposed Development is not located within or near an AQMA.

1.3 This report presents the findings of an air quality assessment of the potential impacts of the Proposed Development on local air quality during the construction and operational phases. The source and significance of potential impacts are identified and the measures that should be employed to minimise these impacts are described. Consideration is also given to the suitability of the Site for its proposed end-use with regards to air quality.

1.4 A glossary of common air quality terminology is provided in **Appendix A.**

Figure 1.1: Site Layout Plan

2 LEGISLATION AND POLICY

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

2.1 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland published in July 2007[1], pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

2.2 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3) and polycyclic aromatic hydrocarbons (PAHs).

2.3 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

2.4 The air quality objectives are medium-term policy-based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

2.5 For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of nitrogen dioxide (NO_2), the short-term standard is for a 1-hour averaging period, whereas for fine particulates (PM_{10}) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

2.6 The AQS objective levels relevant to this assessment are set presented in **Appendix B**.

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007.

Air Quality (England) Regulations

2.7 Many of the objectives in the AQS were made statutory in England with the *Air Quality (England) Regulations 2000*[2] and the *Air Quality (England) (Amendment) Regulations 2002* (the Regulations)[3] for the purpose of Local Air Quality Management (LAQM).

2.8 The Air Quality Standards Regulations (2010)[4] came into force on the 10th June 2010 and adopted into UK law the limit values required by EU Directive 2008/50/EC.These regulations prescribe the 'relevant period' (referred to in Part IV of the Environment Act 1995) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the 'relevant period'. The Air Quality Standards (Amendment) Regulations 2016[5] came into force on 31st December 2016, they amended the Air Quality Standards 2010 to implement the changes made by the EU Directive 2015/1480. The Air Quality Standards Regulations were further amended by the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[6] in January 2020 with regards to $PM_{2.5}$.

2.9 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[7] came into force on the 31st January 2023 and adopted into UK law a Target Value for $PM_{2.5}$.

Local Air Quality Management (LAQM)

2.10 Part IV of the Environment Act 1995 and subsequent amendments in Schedule 11 on the Environment Act 2021 also requires local authorities to periodically review and assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

2.11 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

---

[2] The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928

[3] The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043

[4] The Air Quality Standards Regulations 2010 – Statutory Instrument 2010 No. 1001

[5] The Air Quality Standards (Amendment) Regulations 2016 – Statutory Instrument 2016 No, 1184

[6] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 – Statutory Instrument 2020 No 1313

[7] The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 – Statutory Instrument 2023 No 96

2.12 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

2.13 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work[8]. This guidance, referred to in this chapter as LAQM.TG(22), has been used where appropriate in the assessment.

National Planning Policy Framework

2.14 The National Planning Policy Framework (NPPF)[9] sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

2.15 The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'*

2.16 Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 187) requires that *'planning policies and decisions should contribute to and enhance the natural and local environment by …preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality'*

2.17 In dealing specifically with air quality the NPPF (paragraph 199) states that *'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in*

[8] Department for Environment, Food and Rural Affairs (DEFRA), (2022): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(22).

[9] Ministry of Housing, Communities and Local Government: *National Planning Policy Framework* (December 2024).

local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan'.

2.18 Paragraph 201 states that *'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.*'

Planning Practice Guidance

2.19 Planning Practice Guidance (PPG)[10] was updated in November 2019 and supports the NPPF. Paragraph 001, Reference 32-001-20191101 of the PPG, provides a summary as to why air quality is a consideration for planning:

'*… Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit… The local air quality management (LAQM) regime requires every district and unitary authority to regularly review and assess air quality in their area. These reviews identify whether national objectives have been, or will be, achieved at relevant locations, by an applicable date… If national objectives are not met, or at risk of not being met, the local authority concerned must declare an air quality management area and prepare an air quality action plan… Air quality can also affect biodiversity and may therefore impact on our international obligations under the Habitats Directive… Odour and dust can also be a planning concern, for example, because of the effect on local amenity*.'

2.20 Paragraph 002, Reference 32-002-20191101 of the PPG, concerns the role of Local Plans with regard to air quality;

'*Drawing on the review of air quality carried out for the local air quality management regime, plans may need to consider:*

[10] Ministry of Housing, Communities & Local Government. (2019). Planning Practice Guidance: Air Quality.

- *what are the observed trends shown by recent air quality monitoring data and what would happen to these trends in light of proposed development and / or allocations;*
- *the impact of point sources of air pollution (pollution that originates from one place);*
- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments, including their implications for vehicle emissions;*
- *ways in which new development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example, entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable; and*
- *opportunities to improve air quality or mitigate impacts, such as through traffic and travel management and green infrastructure provision and enhancement.*'

2.21 Paragraph 006, Reference 32-005-20191101 of the PPG, identifies when air quality could be relevant for a planning decision;

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

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

- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value.*

2.22 Paragraph 007, Reference 32-007-20191101 of the PPG, provides guidance on how detailed an assessment needs to be;

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

2.23 Paragraph 008, Reference 32-007-20191101 of the PPG, provides guidance on how an impact on air quality can be mitigated;

'*Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact… Examples of mitigation include:*

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

Mid Sussex District Plan 2014 – 2031

2.24 The Mid Sussex District Plan 2014 – 2031[11] was adopted in March 2018. The District Plan is the main planning document used by the council when considering planning applications. It includes the strategy, proposed level of development and a number of planning policies. The

[11] Mid Sussex District Council. (2018). Mid Sussex District Plan 2014 – 2031

following policy relevant to air pollution and the Proposed Development is contained within this document:

2.25 DP29: Noise Air and Light Pollution, which states

'The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats, and the quality of people's life will be protected from unacceptable levels of noise, light and air pollution by only permitting development where: […]

Air Pollution:

It does not cause unacceptable levels of air pollution;

Development on land adjacent to an existing use which generates air pollution or odour would not cause any adverse effects on the proposed development or can be mitigated to reduce exposure to poor air quality to recognised and acceptable levels;

Development proposals (where appropriate) are consistent with Air Quality Management Plans.'

Control of Dust and Particulates associated with Construction

2.26 Section 79 of the *Environmental Protection Act (1990*) provides the following definitions of statutory nuisance relevant to dust and particles:

- 'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and
- 'any accumulation or deposit which is prejudicial to health or a nuisance'.

2.27 Following this, Section 80 states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

2.28 In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase – potential sources being the clearance, earthworks, construction and landscaping processes.

2.29 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist – 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been

undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates.

EPUK & IAQM Land Use Planning and Development Control

2.30 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in January 2017[12] to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

2.31 The main focus of the guidance is to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts.

2.32 This guidance has been used within this assessment.

Assessment of Dust from Demolition and Construction

2.33 The IAQM published guidance in 2014 on the assessment of emissions from demolition and construction activities. An updated version was published in January 2024[13]. The guidance sets out an approach to identifying the risk of impacts occurring at nearby sensitive receptors from dust generated during the construction process and sets out recommended mitigation measures based on the identified risk.

2.34 This guidance has been used within this assessment.

A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites

2.35 The IAQM published guidance in 2020 on the assessment of air quality impacts on designated nature conservation sites[14]. The guidance provides advice to assist in the assessment of the air quality impacts of development on designated nature conservation sites.

2.36 This guidance has been used within this assessment.

[12] EPUK & IAQM. Land-use Planning and Development Control: Planning for Air Quality, January 2017

[13] Guidance on the assessment of dust from demolition and construction (version 2.2), IAQM, January 2024.

[14] IAQM (2020). A guide to the assessment of air quality impacts on designated nature conservation sites.

Air Quality and Emissions Mitigation Guidance for Sussex

2.37 The Air Quality and Emissions Mitigation Guidance for Sussex[15] supports the principles of the Sussex Air Quality Partnership to improve air quality across Sussex and encourage emissions reductions to improve the environment and health of the population. This guidance aims to:

1) provide clarity to how authorities intend interpreting relevant Local Plan policies.

2) provide advice for developers and their consultants on how to assess and mitigate the impact that new developments may have on local air quality.

3) detail a consistent approach by developers and Local Planning Authorities (LPAs) to:

- *address impacts on local air quality*
- *ensure optimum scheme design to reduce emissions and/or exposure and*
- *avoid unnecessary delays in the planning process.'*

[15] Air Quality and Emissions Mitigation Guidance for Sussex. (2021).

3 METHODOLOGY

Scope of Assessment

3.1 The scope of the assessment has been determined in the following way:

- Review of air quality data for the area surrounding the Proposed Development and background pollutant maps;
- Review of the proposals; and
- Review of the traffic flow data.

3.2 During construction of the development there is the potential for impacts to occur as a result of dust and PM_{10} emissions. Guidance provided by the IAQM recommends that an assessment is undertaken where there are human receptors within 250m of the Site boundary or within 50m of the routes used by construction vehicles up to 250m from the site entrance; and where there are dust sensitive ecological receptors within 50m of the Site boundary or within 50m of the routes used by construction vehicles up to 250m from the site entrance. Human receptors are located within 250m of the Site, but there are no dust sensitive ecological habitats in the vicinity of the Site. An assessment of the impacts of the construction of the Proposed Development on human receptors has therefore been included in the assessment. An assessment of the impacts on ecological receptors has not been considered further.

3.3 Based on the checklists set out in the Sussex Air Quality Partnership Guidance, the proposed development is classed as a 'major' development (i.e. >10 residential dwellings). Following a review of the proposals against the screening checklist set out within the Guidance it is concluded that an air quality and emissions mitigation assessment are required.

3.4 Guidance provided by the EPUK & IAQM provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations outside an AQMA, a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality. At locations inside an AQMA, a change in LDVs of more than 100 per day and / or a change in HDVs of more than 25 per day is considered to result in potentially significant impacts on air quality.

3.5 Data provided by the transport consultants indicate that the Proposed Development is likely to generate 209 LDV AADT on Copthorne Common Road. Therefore, a detailed assessment of operational phase impacts is not considered necessary. The assessment of the operational phase comprises consideration of exposure of future occupants to future pollutant concentrations and the suitability of the Site for its proposed end use.

3.6 Details of the assessment methodology and the specific issues considered are provided below.

Construction Phase Methodology

Introduction

3.7 To assess the potential impacts associated with dust and PM_{10} releases during the demolition and construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the IAQM has been undertaken.

3.8 This approach divides construction activities into the following four categories:

- demolition;
- earthworks;
- construction; and
- trackout (the transport of dust and dirt from the construction site onto the public road network).

3.9 The assessment methodology then considers three separate dust effects:

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to a significant increase in exposure to PM_{10}.

3.10 The assessment of the risk of dust effects is determined by:

- the scale and nature of the works, which determine the risk of dust arising; and
- the proximity of sensitive receptors.

3.11 Risks are described in terms of there being a low, medium or high risk of dust effects for each of the four separate potential activities. This assessment is based on both IAQM criteria and professional judgement.

3.12 Mitigation measures are identified where necessary and significance of dust effects determined following such mitigation. The significance of the dust effects is based on professional judgement, taking into account the sensitivity of the surrounding area and the existing air quality.

Dust Emission Magnitude

3.13 The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works. Table 3.1 summarises the IAQM criteria that may be used to determine the magnitude of the dust emission. These criteria are used in combination with site specific information and professional judgement.

Table 3.1: Dust Emission Magnitude Criteria

Source	Large	Medium	Small
Demolition	• Total building volume >75,000m^3 • Potentially dusty material (e.g. concrete) • Onsite crushing and screening • Demolition activities >12m above ground level.	• Total building volume 12,000 - 75,000m^3 • Potentially dusty material • Demolition activities 6 - 12m above ground level.	• Total building volume <12,000m^3 • Construction material with low potential for dust release • Demolition activities <6m above ground level • Demolition during wetter months
Earthworks	• Total site area >110,000m^2 • Potentially dusty soil type (e.g. clay) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6m in height	• Total site area 18,000 -110,000m^2 • Moderately dusty soil type (e.g. silt) • 5 - 10 heavy earth moving vehicles active at any one time • Formation of bunds 3 - 6m in height	• Total site area <18,000m^2 • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <3m in height
Construction	• Total building volume >75,000m^3 • On site concrete batching • Sandblasting	• Total building volume 12,000 - 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching	• Total building volume <12,000m^3 • Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	• >50 HGV movements in any one day (a) • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m	• 20 - 50 HGV movements in any one day (a) • Moderately dusty surface material (e.g. silt) • Unpaved road length 50 - 100m	• <20 HGV movements in any one day (a) • Surface material with low potential for dust release • Unpaved road length <50m
(a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes.			

Receptor Sensitivity

3.14 Factors defining the sensitivity of a receptor are presented in Table 3.2.

Table 3.2: Factors Defining the Sensitivity of a Receptor

Sensitivity	Human (health)	Human (dust soiling)	Ecological
High	• Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include residential dwellings, hospitals, schools and residential care homes.	• Regular exposure • High level of amenity expected. • Appearance, aesthetics or value of the property would be affected by dust soiling. • Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.	• Nationally or Internationally designated site with dust sensitive features (b) • Locations with vascular species (c)
Medium	• Locations where workers are exposed over a time period relevant to the air quality objectives for PM_{10} (a) • Examples include office and shop workers (d)	• Short-term exposure • Moderate level of amenity expected • Possible diminished appearance or aesthetics of property due to dust soiling • Examples include parks and places of work	• Nationally designated site with dust sensitive features (b) • Nationally designated site with a particularly important plant species where dust sensitivity is unknown
Low	• Transient human exposure • Examples include public footpaths, playing fields, parks and shopping streets	• Transient exposure • Enjoyment of amenity not expected. • Appearance and aesthetics of property unaffected • Examples include playing fields, farmland (e), footpaths, short-term car parks and roads	• Locally designated site with dust sensitive features (b)

(a) In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day.

(b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete).

(c) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.

(d) Does not include workers exposure to PM_{10} as protection is covered by Health and Safety at Work legislation.

(e) Except commercially sensitive horticulture.

3.15 The sensitivity of a receptor will also depend on a number of additional factors including any history of dust generating activities in the area, likely cumulative dust impacts from nearby construction sites, any pre-existing screening such as trees or buildings and the likely duration of the impacts. In addition, the influence of the prevailing wind direction and local topography may be of relevance when determining the sensitivity of a receptor.

Area Sensitivity

3.16 The sensitivity of the *area* to dust soiling and health impacts is dependent on the number of receptors within each sensitivity class and their distance from the source. In addition, human health impacts are dependent on the existing PM_{10} concentrations in the area. Tables 3.3 and 3.4 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts respectively.

Table 3.3: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the source (a)			
		<20m	<50m	<100m	<250m
High	**>100**	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	**>1**	Medium	Low	Low	Low
Low	**>1**	Low	Low	Low	Low

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.

Table 3.4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} ($\mu g/m^3$)	Number of Receptors	Distance from the source (a)			
			<20m	<50m	<100m	<250m
High	> 32	> 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32	> 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28	> 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	< 24	> 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	>32	> 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28-32	> 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.

3.17 For each dust emission source (demolition, construction, earthworks and trackout), the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts.

Risk of Dust Impacts

3.18 The risk of dust impacts prior to mitigation for each emission source is presented in Tables 3.5 and 3.6.

Table 3.5: Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 3.6: Risk of Dust Impacts – Earthworks, Construction and Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Mitigation and Significance

3.19 The IAQM guidance provides a range of mitigation measures which are dependent on the level of dust risk attributed to the site. Site specific mitigation measures are also included where appropriate.

3.20 The IAQM assessment methodology recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity following the application of appropriate mitigation measures. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effects will normally be negligible.

Construction Traffic

3.21 Construction traffic will contribute to existing traffic levels on the surrounding road network. The greatest potential for impacts on air quality from traffic associated with this phase of the Proposed Development will be in the areas immediately adjacent to the principal means of access for construction traffic.

3.22 Information is not currently available regarding the numbers of vehicles associated with construction; however the flows are not predicted to be significant in terms of total emissions or construction duration given the location of the Proposed Development. Impacts from construction traffic on local air quality have not been considered any further within this assessment.

Operational Phase Methodology

3.23 Air quality at the Proposed Development has been predicted using the ADMS Roads dispersion model (Version 5.0.1.3). This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

3.24 The model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations selected by the user. Meteorological data from Gatwick Airport has been used for the assessment.

3.25 The model has been used to predict road specific concentrations of oxides of nitrogen (NO_x) and Particulate Matter (PM_{10} and $PM_{2.5}$) at selected receptors. The predicted concentrations of NO_x have been converted to NO_2 using the NO_x to NO_2 calculator (August 2024) available on the Defra air quality website[16].

3.26 A summary of the traffic data used in the assessment can be found in **Appendix C**. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage Heavy Duty Vehicles (HDV) for the assessment years considered. Low traffic speeds have been assigned to appropriate road links to account for congestion and queuing vehicles.

[16] http://uk-air.defra.gov.uk

3.27 The emission factors released by Defra in March 2025, provided in the emissions factor toolkit EFT2025 v13.1 have been used to predict traffic related emissions in 2024 (for verification purposes) and 2027.

3.28 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been taken from the 2021 Defra background maps (issued November 2024). The maps provide an estimate of background concentrations between 2021 and 2040. The data used for the modelling assessment are set out in Table 4.3.

3.29 Background concentrations for 2024 have been used to predict concentrations in 2027 assuming no change in future years. This is considered to represent a worst-case prediction of future concentrations.

3.30 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process aims to minimise modelling uncertainty and systematic error by correcting the modelled results by an adjustment factor to gain greater confidence in the final results. This process was undertaken using the methodology outlined in Chapter 7, Section 4 of LAQM.TG(22).

3.31 A verification factor of 1.48 was determined which indicates that the model is under-predicting in this area. This factor was applied to the modelled road-NO_x concentrations prior to conversion to annual mean NO_2 concentrations using the NO_x to NO_2 calculator. Further details of the determination of the verification factor are provided in **Appendix D**.

3.32 Local roadside monitoring data was not available for concentrations of PM_{10} and $PM_{2.5}$, the modelled pollutant road-contributions for PM_{10} and $PM_{2.5}$ were therefore adjusted using the verification factor obtained for NO_x as recommended in the guidance provided in LAQM.TG(22).

3.33 A quantitative assessment of air quality in the vicinity of the Proposed Development has been completed against the Air Quality Strategy objectives set out in **Appendix B** for NO_2, PM_{10} and $PM_{2.5}$.

Sensitive Receptors

3.34 LAQM.TG(22) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations '*where members of the public are regularly present*' should be considered. At such locations,

members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

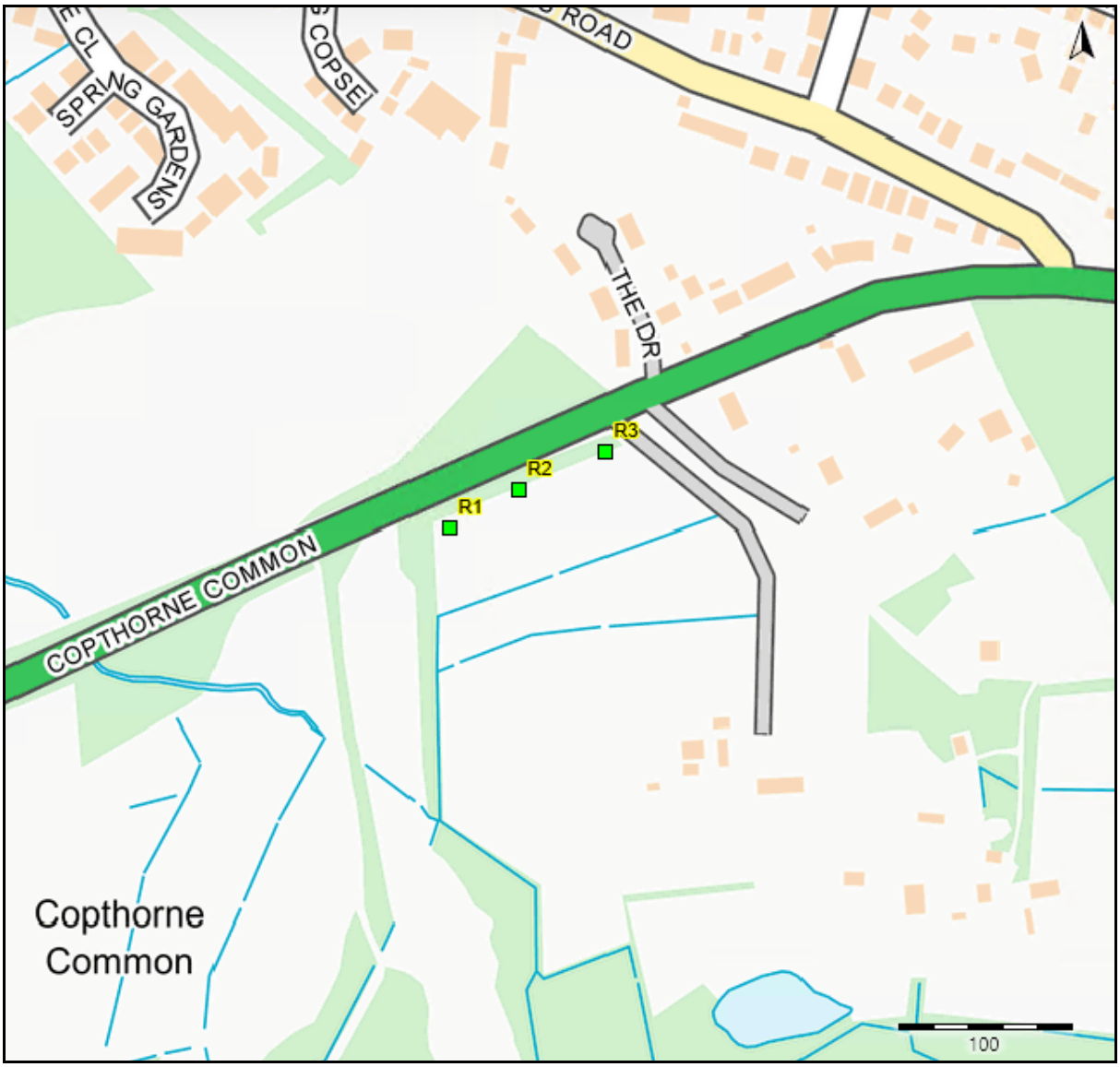
3.35 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. For private dwellings, however; where exposure may be for longer periods, comparison with long-term (such as 24-hour mean or annual mean) standards may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

3.36 The modelling assessment predicted concentrations at three locations at the facades of the Proposed Development and are presented in Table 3.7 below and illustrated in Figure 3.1.

Table 3.7: Location of Sensitive Receptors

ID	Receptor	Easting	Northing
R1	Façade of Proposed Development (northwest corner)	532320.8	139122.3
R2	Façade of Proposed Development (near access)	532362.3	139142.0
R3	Façade of Proposed Development (northeast corner)	532414.8	139158.2

Figure 3.1: Location of Receptors Considered within ADMS Model



4 BASELINE CONDITIONS

Mid Sussex District Council Review and Assessment of Air Quality

4.1 MSDC has carried out detailed assessments of air quality and as a result have not declared any AQMAs. The review and assessment has not identified any exceedances of the air quality objectives in Burgess Hill or in the vicinity of the Site.

Automatic Local Monitoring Data

4.2 MSDC operates one automatic monitoring site located approximately 6.6km to the southeast of the Proposed Development which monitors roadside NO_2 and PM_{10} concentrations. Bias adjusted data obtained from the London Road East Grinstead monitoring station is presented in Table 4.1.

Table 4.1: Pollutant Concentrations recorded at the London Road East Grinstead Automatic Monitor (µg/m^3)

Pollutant	Statistic	2020	2021	2022	2023	2024
NO_2	Annual Mean (µg/m^3)	-	-	24.3	21.1	18.7
	Number of 1-hour means > 200 µg/m^3	-	-	0	0	0
PM_{10}	Annual Mean (µg/m^3)	-	-	18.8	17.0	16.3
	Number of 24-hour means > 50 µg/m^3	-	-	0	1	0
Data obtained from MSDC Air Quality Annual Status Report 2025						

4.3 Exceedences of the AQS objectives for annual mean NO_2 and PM_{10} concentrations have not been experienced at the London Road East Grinstead monitor in the years of monitoring presented.

4.4 No exceedences of the hourly mean objective for NO_2 have been recorded at the London Road East Grinstead monitor, therefore the objective was met in all three monitoring years.

4.5 An exceedence of the 24-hour limit for PM_{10} (50 µg/m^3) has been recorded at the London Road East Grinstead monitor during the three years of the monitoring presented, however the objective allows for 35 exceedences of the 50 µg/m^3 limit in any given year therefore the objective was met in all three monitoring years.

Non-Automatic Monitoring

4.6 NO_2 diffusion tube monitoring is also carried out by MSDC. Data from the closest monitoring site to the Proposed Development, which is located approximately 1.2km to the west of the Proposed Development, is presented in Table 4.2 below.

Table 4.2: NO_2 Concentrations recorded at the nearest Diffusion Tube Monitor (µg/m^3)

Monitoring Site	Type	2020	2021	2022	2023	2024
MSAQ25 – Erica Way Copthorne	Kerbside	18.4	18.8	20.6	18.2	17.7
Data obtained from MSDC Annual Status Report 2025						

4.7 At the closest diffusion tube site to the Proposed Development, NO_2 concentrations were well below (less than 75% of) the annual mean objective between 2020 and 2024.

4.8 Diffusion tubes cannot monitor short-term NO_2 concentrations, however, research has concluded[17] that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3. Annual mean NO_2 concentrations were below 60 µg/m^3 between 2020 and 2024, therefore it is expected that the 1-hour objective is being met at this location.

4.9 Based on the data recorded at this site, NO_2 concentrations are expected to meet the annual mean and 1-hour mean objectives at the Proposed Development.

Defra Background Maps

4.10 Additional information on background concentrations in the vicinity of the Proposed Development have been obtained from the Defra background pollutant maps. The pollutant concentrations from the grid square representing the assessment area (i.e. 532500, 139500) has been extracted from the maps which include the Proposed Development and road links included in the modelling assessment.

4.11 A separate background concentration has been obtained for the grid square representing the monitoring site used in the verification of the modelling.

4.12 The 2021 Defra background maps, which provide estimated background concentrations between 2021 and 2040, have been used to obtain concentrations for 2024. The data is set out in Table 4.3.

Table 4.3: Estimated Annual Mean Background Concentrations from Defra Maps (µg/m^3)

Pollutant	532500, 139500	531500, 138500
NO_2	10.2	10.8
PM_{10}	10.5	-
$PM_{2.5}$	6.5	-

4.13 The data presented in Table 4.3 shows that estimated annual mean background concentrations of NO_2, PM_{10} and $PM_{2.5}$ are well below the relevant annual mean objectives (40 and 20 µg/m^3) respectively in the vicinity of the Site.

[17] D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites.

5 ASSESSMENT OF IMPACT

Construction Phase

Area Sensitivity

5.1 The Site is currently occupied by open fields, therefore there are no buildings requiring demolition at the Site. An assessment of dust effects associated with demolition have not therefore been included within this assessment.

5.2 The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the Site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 5.1.

Table 5.1: Sensitivity of Receptors and the Local Area to Dust and PM_{10} Impacts

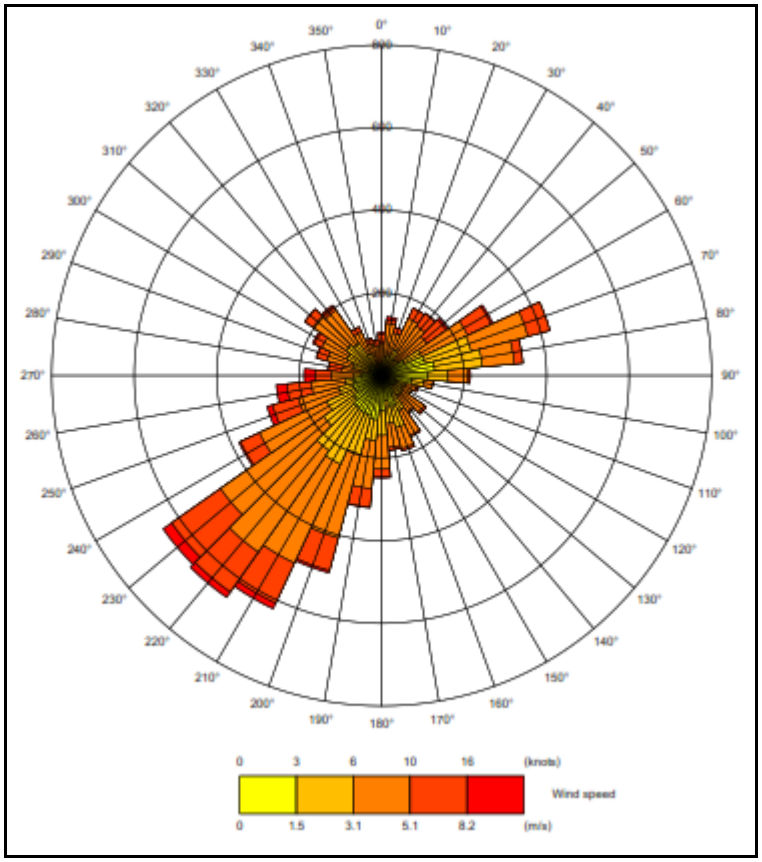
Receptor	Distance from Site Boundary (m)	Approx. Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties	<20 m	0	High	-	High	-
	<50 m	1-10	High	Low	High	Medium
Overall Sensitivity of the Area			**Low**		**Medium**	
(a) Estimated background PM_{10} concentration is 10.5 µg/m^3.						

5.3 Construction traffic will access the Site via Copthorne Common Road, where there are more than ten residential properties within 20m of the roadside. The sensitivity of the area to effects from track out are therefore high for nuisance dust and low for human health.

5.4 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited will depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

5.5 A wind rose from Gatwick Airport is provided in Figure 5.1, which shows that the prevailing wind is from the southwest, therefore receptors to the northeast of the Proposed Development are the most likely to experience dust impacts from the Proposed Development. Residential dwellings along Copthorne Common Road and Borers Arms Road are located to the northeast of the Proposed Development.

Figure 5.1: Wind Rose for Gatwick Airport Meteorological Station



Dust Emission Magnitude

5.6 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling of the Site and landscaping. The total size of the Site is between 18,000m^2 and 110,000m^2. Therefore, the magnitude of the dust emission for the earthworks phase is considered to be *medium*.

5.7 Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build. When completed, the Proposed Development will have a volume between 12,000m^3 and 75,000m^3. Based on the overall size of the Proposed Development the dust emission magnitude is considered to be *medium*.

5.8 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. The number of HGV movements (leaving the Site) is highly unlikely to be more than 50 per day, therefore dust emission magnitude due to trackout is considered to be *medium.*

Dust Risk Effects

5.9 A summary of the potential risk of dust impacts, based on the low overall sensitivity of the area to human health impacts and medium overall sensitivity to dust soiling is presented in Table 5.2.

Table 5.2: Risk of Dust Impacts Prior to Mitigation

Source	Impact Magnitude	Human Health Risk	Dust Soiling Risk
Earthworks	Medium	Low	Medium
Construction	Medium	Low	Medium
Trackout	Medium	Low	Medium

Operational Phase

5.10 Annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations predicted at the Site are set out in Table 5.3. The concentrations include the 2024 Defra background pollutant concentrations indicated in Table 4.3.

Table 5.3: Predicted Annual Mean Pollutant Concentrations at Proposed Receptors (µg/m^3)

Receptor Number	Annual Mean NO_2 Concentration	Annual Mean PM_{10} Concentration	Annual Mean $PM_{2.5}$ Concentration
R1	11.5	11.2	6.8
R2	11.6	11.2	6.8
R3	11.3	11.0	6.8

5.11 The predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations are well below (less than 75% of) the respective 40µg/m^3, 40µg/m^3 and 20µg/m^3 objective levels at the proposed receptor locations in 2027. Therefore, the impact of the Proposed Development with regards to new exposure to air quality is considered to be *negligible*.

5.12 Research has concluded that exceedences of the 1-hour mean objective are unlikely to occur where annual mean concentrations are below 60 µg/m^3. The predicted concentrations at the Proposed Development are well within this level, therefore it is considered unlikely that an exceedence of the short-term objective will occur. The impact of the Proposed Development on hourly mean NO_2 concentrations with regards to new exposure is therefore also considered to be *negligible*.

5.13 LAQM.TG(22) provides a relationship between predicted annual mean concentrations and the likely number of exceedances of the short-term (24-hour mean) PM_{10} objective of 50µg/m^3 (N), where:

$$N = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean}).$$

5.14 The objective allows 35 exceedances per year, which is equivalent to an annual mean of 32µg/m^3. The number of predicted exceedances at all receptors is less than 3 days. Therefore, the risk of an exceedence of the short-term air quality objective for PM_{10} at the Proposed Development is considered to be *negligible*.

5.15 New legislation in 2023 has introduced an additional target for $PM_{2.5}$ of 10µg/m^3 to be achieved by the year 2040 and an interim target of 12µg/m^3 to be achieved by 2028. The predicted annual mean $PM_{2.5}$ concentrations at the Proposed Development are below the 10µg/m^3 target, therefore it is considered that the Proposed Development will not hinder the achievement of the future targets for $PM_{2.5}$.

EMISSIONS MITIGATION CALCULATION

5.16 An emissions mitigation calculation was carried out following the Sussex Air Quality Guidance. The inputs used for the Defra EFT, which is used to estimate the mass of pollutants emitted, and the subsequent calculation are provided in Table 5.4.

Table 5.4: Emissions Mitigation Calculation

	NO_x	$PM_{2.5}$
Proposed Development Trips (as AADT)(1)	209 (0% HGV)	
Average Trip Length (km)(2)	10	
Emissions (kg/yr)(3)	110.83	9.50
Emissions (tonnes/yr)	0.11	0.01
Damage Cost (per tonne)(4)	£9,054	£63,766
Cost of 5 Year Exposure	£5,017.21	£3,029.30
Total	**£8,046.51**	

(1) Provided by Transport Consultants (Campbell Reith)

(2) Obtained from National Travel Survey (UK Average)

(3) Value obtained from EFT spreadsheet for 2027 (assuming average speed of 80kph)

(4) IGCB Air Quality Damage Costs per tonne (2022 prices) (Central Estimate for Transport Urban Medium)

5.17 The Emissions Mitigation Calculation presented above suggests a damage cost of £8,046.51. A range of costs is provided, the above damage cost is based on the Central Estimate.

6 MITIGATION

Construction Phase

6.1 The control of dust emissions from construction site activities relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, construction operations have been successfully undertaken without impacts to nearby properties.

6.2 Overall the Site is considered to be a medium risk of dust impacts and low risk to human health from particulate matter concentrations at nearby receptors during the construction phase. Appropriate mitigation measures for the Site have been identified following the IAQM guidance and based on the risk effects presented in Table 5.2. It is recommended that the 'highly recommended' measures set out in **Appendix E** are adhered to during the construction phase.

6.3 In addition to the 'recommended' measures, the IAQM guidance also sets out a number of 'desirable' measures which should also be considered. These are also reproduced in **Appendix E**.

6.4 Following implementation of the 'highly recommended' measures outlined in the IAQM guidance and reproduced in **Appendix E**, the impact of emissions during construction of the Proposed Development would be negligible.

Operational Phase

6.5 The results of the assessment indicated that the future occupants of the proposed development are unlikely to be exposed to elevated concentrations of NO_2, PM_{10} and $PM_{2.5}$.

6.6 The Emissions Mitigation Assessment determined a total damage cost of £8,046.51, which the guidance suggests should be an indication of the value of a package of mitigation measures to reduce emissions. Table 6.1 identifies the proposed mitigation measures.

Table 6.1: Proposed Mitigation Measures

Mitigation Type	Mitigation	Mitigation Target
Preparation, implementation and management of Travel Plan (5 years)	£12,500 (£2,500/year)	£8,046.51

6.7 As shown in Table 6.1, the cost of implementing the above mitigation will exceed the Damage Cost figure calculated in Table 5.3 by a significant margin. The implementation of the above mitigation should further reduce the impact of emissions during operation of the Proposed Development.

7 CONCLUSIONS

7.1 An air quality impact assessment has been carried out to assess both construction and operational impacts of the Proposed Development.

7.2 An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management Guidance. This has shown that for the Proposed Development, limited releases of dust and particulate matter are likely to be generated from on-site activities. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and particulate matter releases may be effectively mitigated and the resultant impacts are considered to be negligible.

7.3 There is no significant traffic associated with the Proposed Development, therefore the impact of the operational Proposed Development on local air quality is considered negligible. The impact of traffic has been considered with respect to the suitability of the Site for its proposed use only.

7.4 ADMS Roads dispersion modelling has been carried out to assess the suitability of the Site for its proposed end use with regards to local air quality. The results indicate that predicted concentrations of relevant pollutants (NO_2, PM_{10} and $PM_{2.5}$) concentrations are below the relevant objectives within the Proposed Development.

7.5 Future occupants of the Proposed Development would not be exposed to pollutant concentrations above the relevant objective levels. The impact of the Proposed Development with regards new exposure to air quality is therefore considered to be negligible.

7.6 An Emissions Mitigation Assessment has been carried out in accordance with the Air Quality Emissions and Mitigation Guidance for Sussex. A damage cost of £8,046.51 was determined and mitigation measures are provided to off-set this figure.

7.7 It is concluded that air quality does not pose a constraint to the Proposed Development, either during construction or once operational.

APPENDIX A - AIR QUALITY TERMINOLOGY

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10^9) units of air, there is one unit of pollutant present.
ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10^6) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m^3 micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1ug/m3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

APPENDIX B - AIR QUALITY STRATEGY OBJECTIVES

Table B1: Air Quality Strategy Objectives

Pollutant	Objective Level ($\mu g/m^3$)	Averaging Period	No. of Permitted Exceedances	Notes
NO_2	200 (a)	1-Hour	18 per annum (99.8th percentile)	
	40 (a)	Annual	-	
PM_{10}	50 (a)	24-Hour	35 per annum (90.4th percentile)	
	40 (a)	Annual	-	
$PM_{2.5}$	20 (b)	Annual		
	12 (b)	Annual		Interim Target to be achieved by end Jan 2028
	10 (c)	Annual		Target Level to be achieved by end Dec 2040

(a) Air Quality Standards Regulations (2016) and amendments

(b) Environmental Improvement Plan 2023

(c) The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

APPENDIX C - SUMMARY OF TRAFFIC DATA

Table C1: Traffic data utilised for the air quality assessment (AADT)

Road Link	Speed (kph)		2024 Verification Study		2027 With Development	
	Freeflow	Junction/ Congestion	AADT	% HGV	AADT	% HGV
Copthorne Common Road ATC	80	30	-	-	25,392	12.0
Copthorne Common Road DfT Counter 57661	80	30	23,011	4.1	25,228	4.0
Copthorne Way DfT Counter 8248	80	30	29,099	3.8	31,493	3.0
Copthorne Road DfT Counter 36879	80	30	9,227	2.4	-	-

APPENDIX D – VERIFICATION AND ADJUSTMENT OF MODELLED CONCENTRATIONS

Nitrogen Dioxide (NO_2)

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. Verification of concentrations predicted by the ADMS model has followed the methodology presented in LAQM.TG(22).

The model has been run to predict annual mean road-NO_x concentrations at one nearby monitoring site.

The model output of road-NOx (i.e. the component of total NO_x coming from road traffic) has been compared to the 'measured' road-NO_x (Table D1). The 'measured' road NO_x has been calculated from the measured NO_2 concentrations by using the Defra NO_x to NO_2 calculator available on the UK-AIR website.

Table D1: Comparison of Modelled and Monitored NOx concentrations

Monitoring Location	Total Monitored NO_2	Background NO2	Monitored Road NOx	Modelled Road NOx	Ratio
MSAQ25	17.7	10.8	14.9	10.0	1.48

The results in Table D1 indicate that the ADMS model under-predicted the road NO_x concentrations at the selected monitoring site. An adjustment factor was therefore determined as the ratio between the measured road-NO_x contribution and the modelled road-NO_x contribution (1.48). This factor has then been applied to the modelled road-NO_x concentration for each location to provide an adjusted modelled road-NO_x concentration.

The annual mean road-NO_2 concentration was determined using the Defra NO_x:NO_2 spread sheet calculation tool and added to the background NO_2 concentration to produce a total adjusted NO_2 concentration.

Particulate Matter (PM_{10} and $PM_{2.5}$)

There was insufficient roadside monitoring data available against which the modelling could be verified. Consequently, the verification factor determined above for adjusting the road-NO_x

contribution has been applied to the predicted road-PM_{10} and road-$PM_{2.5}$ contributions, consistent with guidance provided in LAQM.TG(22).

APPENDIX E – CONSTRUCTION MITIGATION MEASURES

The following measures are detailed in the IAQM guidance as being 'highly recommended' for sites of the level of risk identified for the Site. It is therefore recommended that these measures are adhered to during the construction works.

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- record all dust and air quality complaints, identify cause, 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 off- site and the action taken to resolve the situation in the log book;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to the local authority when asked;
- increase frequency of site inspection 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 periods of 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 is a large site, before work on a phase commences. Further guidance is provided by the IAQM on *monitoring during demolition, earthworks and construction*.
- 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 as necessary that are at least as high as any stockpiles;
- fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible unless being re-used on site.
- Cover, seed or fence stockpiles to prevent wind whipping;
- 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;
- 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 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;
- avoid bonfires and burning of waste materials;
- 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;
- 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;
- 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, 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; and
- Access gates to be located at least 10m from receptors where possible.

The following 'desirable' measures should also be considered for inclusion:

- undertake daily on-site and off-site inspection, where receptors area nearby, to monitor, record inspection results and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary;
- 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);
- implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing);
- soft strip inside building before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable;
- only remove the cover in small areas during work and not all at once;
- avoid scabbling (roughening of concrete surfaces);
- 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; and
- for smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.