



6.0 Air Quality

6.1 Introduction

- 6.1.1 This Chapter of the ES assesses the likely significant effects of the Proposed Development with respect to Air Quality. This Chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the Site and surrounding areas; the mitigation measures required to prevent, reduce or offset any significant negative effects; and the likely residual effects after these measures have been adopted.
- 6.1.2 The Proposed Development is located in close proximity to the A3 (M) motorway, which is considered a significant source of road vehicle exhaust emissions and as such, there is the potential that the development may introduce future site users to poor air quality. Additionally, due to the scale of the proposals the development has the potential to cause air quality impacts at nearby sensitive locations during the construction and operational phases. As such, an Air Quality Assessment was required to quantify baseline conditions, consider the suitability of the Site for the proposed end-use and assess potential impacts as a result of the development
- 6.1.3 The chapter has been prepared with due regard to the requirements of Havant Borough Council (HBC) Environmental Health Department. Reference should be made to Appendix 6.1 for the associated Chapter figures; as well as Appendix 6.2 for the details of the utilised assessment inputs.

6.2 Methodology and Scope

Key Legislation

European Legislation

- 6.2.1 European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new air quality objectives for particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}). The consolidated Directives include:
- Directive 99/30/EC - the First Air Quality "Daughter" Directive - sets ambient Air Quality Limit Values (AQLVs) for nitrogen dioxide (NO₂), oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
 - Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and
 - Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.
- 6.2.2 The fourth daughter Directive was not included within the consolidation and is described as:
- Directive 2004/107/EC - sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

UK Legislation

- 6.2.3 The Air Quality Standards (Amendment) Regulations (2016) came into force on 31st December 2016. These Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive

2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

- 6.2.4 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007ⁱ. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.
- 6.2.5 Table 6.1 presents the AQOs for pollutants considered within this assessment.

Table 6.1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m ³)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
PM ₁₀	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year

- 6.2.6 Table 6.2 summarises the advice provided in DEFRA guidance LAQM (TG16)ⁱⁱ on where the AQOs for pollutants considered within this report apply.

Table 6.2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term



Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

Local Air Quality Management

- 6.2.7 Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of administration under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations where members of the public are regularly present for the relevant averaging period are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

Dust

- 6.2.8 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2018) are those provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:
- any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."*
- 6.2.9 Enforcement of the Act, in regard to nuisance, is currently under the administration of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practice measures.

National Planning Policy Framework

- 6.2.10 The National Planning Policy Framework (NPPF) was published on 24th July 2018 (updated on 19th February 2019) and sets out the Government's core policies and principles with respect to land use

planning, including air quality. The document includes the following considerations which are relevant to this assessment:

"The planning system should contribute to and enhance the natural and local environment by:

[...]

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

Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent

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

National Planning Practice Guidance

- 6.2.12 The National Planning Practice Guidanceⁱⁱⁱ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The relevant air quality sections are highlighted below:
- 6.2.13 Paragraph 001 states that: "*Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values*" and "*It is important that the potential impact of new development on air quality is taken into account, where the national assessment indicates that relevant limits have been exceeded or are near the limit*". The role of Local Authorities under LAQM are stated and that Air Quality Action Plans should "*identify measures that will be introduced in pursuit of the objectives*"
- 6.2.14 Paragraph 005 states that "*Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation*"
- 6.2.15 Paragraph 007 states that "*Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality*". In terms of mitigation, it states that "*Mitigation options where necessary will be location specific, will depend on the proposed development and should be proportionate to the likely impact*".
- 6.2.16 Paragraph 009 shows a flow chart highlighting how the assessment of air quality impacts should fit into the development management process. It makes it clear that air quality impact risks, AQLVs and AQOs should be considered in the decision-making process.
- 6.2.17 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

Local Planning Policy

- 6.2.18 HBC are in the process of consultation for the adaption of the Havant Borough Local plan 2036^{iv}. As such, the policies contained within the document will provide the basis for the determination of future planning applications within HBC's area of administration.



- 6.2.19 A review of the Pre-Submission Havant Borough Local Plan 2036 indicated the following policy in relation to air quality that is relevant to this assessment:

"Policy E23 - Air Quality

Offsetting emissions

- a. Major development proposals will be expected to provide mitigation measures which offset emissions and are proportionate to the scale and nature of the development.

Threshold based assessment

In addition to a., development proposals of 150 or more (gross) residential units, 1,000 sqm or more of commercial floorspace, or which are likely to materially alter the traffic flow on the local highway network will be permitted where:

- b. Projected levels of air pollution or emissions associated with the development would not result in a significant deterioration of current air quality at a location where national air quality objectives or limit values apply; or
- c. Measures are provided which demonstrably mitigate the impact on air quality to an acceptable level.

- 6.2.20 Until the adoption of the Draft Havant Borough Plan 2036, the current Local Plan is made up of the Core Strategy (2011) and the Site Allocation Plan (2014). A review of the Core Strategy (2011)^v indicated the following policy in relation to air quality that is relevant to this assessment:

"Policy DM10: Pollution

Development that may cause pollution of water, air or soil or pollution through noise, smell, smoke, fumes, gases, steam, dust, vibration, light, heat, electromagnetic radiation and other pollutants will only be permitted where all of the following relevant criteria can be met:

- a. The health and safety of existing and future users of the site, or nearby occupiers and residents in not put at risk.
- b. National air quality standards or objectives would not be breached.

[...]

- 6.2.21 A review of the Site Allocation Plan (2014)⁷ indicated the following policy in relation to air quality that is relevant to this assessment:

"Policy DM18: Protecting New Development from Pollution

Planning permission will be granted for development provided that projected levels of air, noise, vibration, light, water or other pollution do not have significant negative affect on the amenity of future occupiers or users of the proposed development."

- 6.2.22 Reference has been made to these policies during the undertaking of this Baseline and ES Scoping Report by assessing the potential impacts of the proposed developments.

Scoping Assessment Stage

- 6.2.23 A scoping opinion was sought from a number of consultees and one response was provided by Natural England concerning impacts upon designated ecological receptors. The purpose of the consultation was to agree on the appropriate assessment methodology, and subsequently, appropriate assessment regarding construction and operation phase impact were undertaken in line with the relevant IAQM guidance.

Assessment Methodology

- 6.2.24 The Proposed Development has the potential to cause air quality impacts during the construction and operational phases in addition to exposing future site users to elevated pollution levels. These issues have been assessed in accordance with the following methodology.

Construction Phase Assessment

- 6.2.25 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction'^{vi}.

- 6.2.26 Activities on the proposed construction site have been divided into three types to reflect their different potential impacts. These are:

- Earthworks;
- Construction; and
- Trackout

- 6.2.27 The potential for dust emissions was assessed for each activity that is likely to take place and considered 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 PM₁₀.

- 6.2.28 The assessment steps are detailed below.

Step 1

- 6.2.29 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the site boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed to Step 2.

- 6.2.30 Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Step 2

- 6.2.31 Step 2 assesses the risk of potential dust impacts. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

- 6.2.32 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.



6.2.33 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 6.3.

Table 6.3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Earthworks	- Total site area greater than 10,000m² - Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) - More than 10 heavy earth moving vehicles active at any one time - Formation of bunds greater than 8m in height - More than 100,000 tonnes of material moved
	Construction	- Total building volume greater than 100,000m³ - On site concrete batching - Sandblasting
	Trackout	- More than 50 Heavy Duty Vehicle (HDV) trips per day - Potentially dusty surface material (e.g. high clay content) - Unpaved road length greater than 100m
Medium	Earthworks	- Total site area 2,500m² to 10,000m² - Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time - Formation of bunds 4m to 8m in height - Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	- Total building volume 25,000m³ to 100,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching
	Trackout	10 to 50 HDV trips per day - Moderately dusty surface material (e.g. high clay content) - Unpaved road length 50m to 100m
Small	Earthworks	- Total site area less than 2,500m² - Soil type with large grain size (e.g. sand) - Less than 5 heavy earth moving vehicles active at any one time - Formation of bunds less than 4m in height - Total material moved less than 20,000 tonnes - Earthworks during wetter months
	Construction	- Total building volume less than 25,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	- Less than 10 HDV trips per day - Surface material with low potential for dust release - Unpaved road length less than 50m

6.2.34 Step 2B defines the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table 6.4

Table 6.4 Example of Factors Defining Sensitivity of an Area

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

6.2.35 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts during the construction phase:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and the receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

6.2.36 These factors were considered in the undertaking of this assessment.



6.2.37 The sensitivity of the area to dust soiling effects on people and property is shown in Table 6.5.

Table 6.5 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

6.2.38 Table 6.6 outlines the sensitivity of the area to human health impacts.

Table 6.6 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	-	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
Low	-	1 - 10	Low	Low	Low	Low	Low

6.2.39 Table 6.7 outlines the sensitivity of the area to ecological impacts.

Table 6.7 Sensitivity of the Area to Ecological Impacts

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

6.2.40 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table 6.8 outlines the risk category from earthworks and construction activities.

Table 6.8 Dusk Risk Category from Earthworks and Construction

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

6.2.41 Table 6.9 outlines the risk category from trackout.

Table 6.9 Dusk Risk Category from Trackout

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



Step 3

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

Step 4

- 6.2.43 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'. This has been described as negligible within this report to provide continuity between assessment terminologies.
- 6.2.44 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

Operational Phase Assessment

- 6.2.45 The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO₂ and PM₁₀, associated with operation of the site. Additionally, due to the proximity to the A3 (M) the proposals also have the potential to expose future site users to elevated pollutant concentrations. Detailed dispersion modelling was therefore undertaken to quantify NO₂ and PM₁₀ concentrations across the Site and determine suitability for the proposed use, using the following scenarios based on the worst-case scenarios:
- 2016 Verification;
 - Operational year do-minimum (DM) (predicted traffic flows in 2025 should the proposals not proceed, with the addition of committed development flows); and
 - Operational year do-something (DS) (predicted traffic flows in 2025 should the proposals be completed with the addition of traffic flows generated by the development, with the addition of committed development flows).
 - Opening year do-minimum (DM) (predicted traffic flows in 2035 should the proposals not proceed, with the addition of committed development flows); and
 - Opening year do-something (DS) (predicted traffic flows in 2035 should the proposals be completed with the addition of traffic flows generated by the development, with the addition of committed development flows);
- 6.2.46 Reference should be made to Appendix 6.2 for assessment input data.

Receptor Sensitivity

- 6.2.47 Receptors potentially sensitive to changes in NO₂ and PM₁₀ concentrations were identified within 200m of the affected highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB) on the likely limits of pollutant dispersion from road sources. LAQM (TG16)ⁱⁱ provides the following examples of where annual mean AQOs should apply:
- Residential properties;
 - Schools;

- Hospitals; and
- Care homes.

Effect Significance

- 6.2.48 The sensitivity impact significance of each receptor was defined in accordance with the criteria shown in Table 6.10. These are based upon the guidance provided within the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance 'Land-Use Planning and Development Control: Planning for Air Quality'.^{vii}

Table 6.10 Operational Traffic Exhaust Emissions - Significance of Impact

Long Term Average Concentration	% Change in Concentration Relative to AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

- 6.2.49 The criteria shown in Table 6.10 is adapted from the EPUK and IAQM guidance 'Land-Use Planning and Development Control: Planning for Air Quality'^{viii} with sensitivity descriptors included to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible in accordance with the EPUK and IAQM guidance.
- 6.2.50 Following the prediction of impacts at discrete receptor locations utilising the criteria in Table 6.10, the EPUK and IAQM^{ix} document states that this framework is to be used as a starting point to make a judgement on significance of effect but other influences might need to be accounted for. Whilst impacts might be determined as 'slight', 'moderate' or 'substantial' at individual receptors, overall effect might not necessarily be deemed as significant in some circumstances. The following factors may provide some assistance in determining the overall significance of a development:
- Number of properties affected by significant air quality impacts and a judgement on the overall balance;
 - Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
 - The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors;
 - Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease; and
 - The extent to which an objective is exceeded e.g. an annual mean NO₂ concentration of 41µg/m³ should attract less significance than an annual mean of 51µg/m³.
- 6.2.51 These factors were considered, and an overall significance determined for the impact of operational phase road traffic emissions. It should be noted that the determination of significance relies on



professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

6.3 Assumptions and Limitations

- 6.3.1 The assessment is limited by the following assumptions that were based on professional judgement:
- The soil type on site being potentially dusty;
 - The unpaved construction road length being greater than 100m;
 - The accuracy of estimates of background pollutant concentrations;
 - Uncertainties in source activity data such as traffic flows and emission factors;
 - Variations in meteorological conditions between the site and observation station;
 - Overall dispersion model limitations (discussed further in Appendix 6.2); and
 - Uncertainties associated with pollutant monitoring data.
- 6.3.2 Robust assumptions have been made where possible to reduce the likelihood of underestimating the impacts of all potential emissions. For example, the use of 2016 background air quality concentrations when considering future year assessment scenarios increases the likelihood of over predicting the operational phase impacts. In addition, to assume the worst-case scenario, the scenarios used in this assessment were based on the first year of construction plus 15 years. This meant that the assessment was based on year 2020 and 2035; with year 2025 chosen as an intermediate year for ease of comparison of the datasets.
- 6.3.3 Additionally, the 2030 background pollutant concentrations datasets were downloaded to represent the 2035 opening year as this was the latest year in which data was available.
- 6.3.4 Any flexibilities in the results due to assumptions made in the construction phase assessment are covered by the flexibility and ad-hoc nature of the recommended dust mitigation measures. It is therefore considered that any flexibilities in data and assumptions used in this Chapter are unlikely to significantly alter the conclusions of the air quality assessment.

6.4 Baseline Environment

Existing baseline

- 6.4.1 Existing air quality conditions in the vicinity of the Proposed Development were identified in order to provide a baseline for assessment. These are detailed in the following sections.

Local Air Quality Management

- 6.4.2 HBC has undertaken Review and Assessment of air quality within their area of administration. This process has indicated that annual mean concentrations of NO₂ and PM₁₀ are below the AQO Objectives within the borough. As such, no AQMA's have been declared.
- 6.4.3 HBC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have been designated.

Air Quality Monitoring

- 6.4.4 HBC did not undertake any automatic (continuous) monitoring during 2016. However, HBC utilises passive diffusion tubes to monitor NO₂ concentrations throughout the district. A review of the most recent monitoring data available indicated that there are three diffusion tubes located in the vicinity of

the Proposed Development and monitoring results from recent years which are summarised in Table 6.11

Table 6.11 Diffusion Tube Monitoring Results

Site Name		Type	NGR (m)		Annual Mean NO ₂ Concentration (µg/m ³)		
			X	Y	2016	2017	2018
8	London Road (Purbrook)	Roadside	467322	107976	26.80	26.28	27.84
25 (b)	Stakes Road	Kerbside	468479	107721	24.44	23.06	26.82
26	Ladybridge Road	Roadside	467288	107849	24.90	24.34	n/a

- 6.4.5 As shown in Table 6.12, background concentrations of NO₂ did not exceed the relevant AQOs. Comparison with the monitoring results indicates the impact that vehicle exhaust emissions from the highway network have on pollutant concentrations at roadside locations.

Background Pollutant Concentrations

- 6.4.6 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The Proposed Development is located in grid squares NGR: (469500, 106500), (468500, 106500), (468500, 107500) and (469500, 107500). Data for these locations were downloaded from the DEFRA website^x and an average was taken between the grids for the purpose of this assessment for the verification year (2016), the Operational Year (2025) and Opening Year (2035). The average concentrations are summarised in Table 6.12. Please note that 2030 background concentrations were downloaded to represent the 2035 opening year as this was the latest year in which data was available.

Table 6.12 Predicted Background Pollutant Concentrations

Pollutant	Predicted Background Concentration (µg/m ³)		
	2018	2025	2035
NO _x	17.87	19.54	14.55
NO ₂	18.65	13.93	10.82
PM ₁₀	15.09	14.02	14.48

- 6.4.7 As shown in Table 6.12, background concentrations of NO₂ did not exceed the relevant AQOs. Comparison with the monitoring results indicates the impact that vehicle exhaust emissions from the highway network have on pollutant concentrations at roadside locations.

Sensitive Receptors

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



Construction Phase Sensitive Receptors

6.4.9 Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 6.13.

Table 6.13 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	10 - 100	1
20 - 50	More than 100	1
50 - 100	More than 100	-
100 - 350	More than 100	-

- 6.4.10 Reference should be made to Figure 6.3 within Appendix 6.1 for a graphical representation of earthworks and construction dust buffer zones.
- 6.4.11 A desktop study of ecological designations within a 50m buffer of the Site boundary indicated the following designations which could potentially be affected by construction phase fugitive dust emissions:
- Littlepark Wood (Ancient and Semi-Natural Woodland).
- 6.4.12 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access route. These are summarised in Table 6.14. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. However, it was assumed construction traffic would access the site from College Road to ensure the maximum potential trackout distance was considered.

Table 6.14 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	10 - 100	3
20 - 50	10 - 100	3

- 6.4.13 Reference should be made to Figure 6.4 within Appendix 6.1 for a graphical representation of trackout dust buffer zones. A desk-top study indicated that the following designations are within 50m from the proposed trackout routes:
- Gundymoor Wood (Ancient Replanted Woodland)
 - Johnstons Coppice (Ancient and Semi-Natural Woodland)
 - Littlepark Wood (Ancient and Semi-Natural Woodland)
- 6.4.14 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 6.15.

Table 6.15 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The site is located within a predominantly residential area. There is likely to have been a history of dust generating activities due to development in the locality
The likelihood of concurrent dust generating activity on nearby sites	A review of the HBC Planning Portal indicated that there are no large-scale development schemes in the locality of the site. As such, the likelihood of concurrent dust generating activity is minimal.
Pre-existing screening between the source and the receptors	There is vegetation present along the southern, western and northern boundaries. If retained, this could provide a natural protective screen to receptors in these directions
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the south-west of the development, as shown in Figure 6.5 within Appendix 6.1. As such, properties to the north-east would be most affected by dust emissions. Additionally, due to the south west wind direction, it is considered that the internationally designated ecological sites located to the west of the development site would be considered to be downwind of the source of fugitive dust emissions.
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is likely to extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline

- 6.4.15 Based on the criteria shown in Table 6.4, the sensitivity of the receiving environment to potential dust impacts was considered to be high. This was because users would expect to enjoy a reasonable level of amenity, aesthetics or value of their property could be diminished by soiling and people would be expected to be present for extended periods of time e.g. residential properties. The sensitivity of the ecological receptors was defined as high in order to ensure that a robust assessment is undertaken. This was due to the presence of international designations to the
- 6.4.16 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.1.2, is shown in Table 6.16.

Table 6.16 Sensitivity of the Surrounding Area

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



Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Ecological	High	High	High

Operational Phase Human Sensitive Receptors

6.4.17 Receptors sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 6.17. All sensitive receptors were modelled at a height of 1.5m to represent ground floor level.

Table 6.17 Road Vehicle Exhaust Emission Sensitive Receptors

Receptor		NGR (m)	
		X	Y
R1	School- Havant and South Downs College	468959	107334
R2	Residential - 8 Downs Close	468877	107331
R3	Residential - 3 Purbrook Way	468635	107680
R4	Residential - 10 Khandala Gardens	468570	107689
R5	Residential - Morelands Court	468579	107643
R6	Residential - Off Portsdownhill Road	469466	106464
R7	Residential - Brooklands Road	469561	106536
R8	Residential - off Portsdownhill Road	469532	106596
R9	Residential - Delphi Way	468645	107011
R10	Residential - 7 Atlantis Avenue	468516	106834
R11	School - Crookhorn College of Technology	468741	107748
R12	Residential - 12 Portsdownhill Road	469878	106556
R13	Residential - Bedhampton Road	470014	106593
R14	Residential - Bedhampton Hill Road	469821	106397
R15	Residential - 41 Portsdownhill Road	469268	106342
R16	Residential - 22 Crookhorn Lane	468487	107514
R17	Residential - 72 Stokes Road	467922	107761

Receptor		NGR (m)	
		X	Y
R18	Residential - 238 Stakes Hill Road	468593	107932
R19	Residential - 126 London Road	467197	107669
R20	Residential - 66 London Road	467365	108095
R21	Residential - 106 London Road	467153	107391
R22	Residential - 183 Park Avenue	467668	107769
R23	Residential - Glebe Park Avenue	469506	106315
R24	Residential - Glebe Park Avenue	469534	106248
R25	Residential - Glebe Park Avenue	469572	106172
R26	Residential - 48 Auriol Drive	469285	105975
R27	Residential - 379 Havant Road	468726	105836
R28	Residential - 325 Havant Road	468321	105806

6.4.18 The sensitive receptors identified in Table 6.17 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience air quality impacts as a result of the Proposed Development that have not been individually identified above. Reference should be made to Figure 6.6 within Appendix 6.1 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

Operational Phase Ecological Sensitive Receptors

6.4.19 The development may have the potential to impact on existing RAMSAR, Special Area of Conservation (SAC) and Special Protection Areas (SPAs) as a result of additional road traffic exhaust emissions associated with operation of the Proposed Development.

6.4.20 The IAQM guidance document "A Guide to the Assessment of Air Quality impacts on Designated Nature Conservation Sites, IAQM, 2019" states the following methodology to help establish when an air quality is likely to be considered necessary. The methodology is split into the following three sections:

- Scoping;
- Quantification; and
- Screening;

Scoping

6.4.21 A desktop study is conducted to identify sensitive ecological receptors which fall within 200m of the road network which is likely to be used by traffic associated with the Proposed Development. If all ecological sites fall outside of the 200m buffer, then no further action is required and the site should not be assessed further.

6.4.22 The desk top survey indicated the following designations within 200m of the affected road network:



- Chichester and Langstone Harbour Ramsar;
- Chichester and Langstone Harbours SPA;
- Solent Maritime SAC;
- Solent and Isle of Wight Lagoons SAC;
- Portsmouth Harbour Ramsar; and,
- Portsmouth Harbour SPA.

Screening

- 6.4.23 Given that potential impacts have been scoped in, the next stage of assessment is to considered screening based on AADT or air quality impacts. It is considered that traffic impacts can be screened out if predicted AADT traffic flows from cumulate developments are predicted to cause increases of less than 1000 AADT or 200 HDV's within 200m of ecological sites.
- 6.4.24 Given the associated traffic data there is potential for air quality changes to affect the aforementioned Ramsars, SACs and SPAs. Therefore, impacts upon the aforementioned designation may require further mitigation.

6.5 Mitigation within the Submitted Design

Construction Phase

- 6.5.1 Particular care will be taken regarding dust emissions so that they are kept to a practicable minimum, especially when working in the vicinity of residential or commercial properties in the vicinity of the Site.
- 6.5.2 The IAQM guidance^{vi} provides a number of potential mitigation measures to reduce potential impacts from the construction phase. The Site has been classified as high risk and as such it was identified that mitigation measures are required to reduce the associated risk to an acceptable level.
- 6.5.3 Such mitigation measures have therefore been adapted for the Site and summarised in Table 6.18. It will be required to review these measures prior to the commencement of construction works and incorporated into existing strategies.

Table 6.18 Fugitive Dust Mitigation Measures

Issue	Control Measure
Communications	• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary • Develop and implement a stakeholder communications plan that includes community engagement • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site Management	• Record all dusty and air quality complaints and make the complaints log available to the LA when asked • Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation • Make complaints log available to LA when asked

Issue	Control Measure
Monitoring	• Carry out regular site inspections to monitor compliance with the DMP • Increase frequency of site inspections when activities with a high potential to produce dust are being carried out
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors • Fully enclose site or specific operations where there is a high potential for dust production and the site as actives for an extensive period • Avoid site runoff of water or mud • Use water as dust suppressant where applicable • 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 • Cover, seed or fence stockpiles to prevent wind whipping
Operating Vehicle/ Machinery and Sustainable Travel	• All vehicles to switch off engines - no idling vehicles • Avoid the use of diesel- or petrol-powered generators where practicable • Implement a Travel Plan that supports and encourages sustainable travel • Produce a Construction Logistics Plan to manage sustainable deliveries
Operations	• Cutting equipment to use water as dust suppressant or suitable local extract ventilation • Ensure adequate water supply on the site for effective dust/particulate matter suppression/mitigation • Use enclosed chutes and covered skips • Minimise drop heights • Ensure equipment is readily available on site to clean any spillages
Waste Management	• No bonfires
Earthworks and Construction	• Avoid scabbling • Ensure sand and other aggregates are stored and not able to dry out, unless it is required for a specific process
Trackout	• Use water-assisted dust sweeper on the access and local roads • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving sites are covered to prevent escape of materials • Inspect on-site routes for integrity, instigate necessary repairs and record in site logbook • Install hard surfaced haul routes which are regularly damped down • Implement a wheel washing system at a suitable location near site exit • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits • Access gates to be located at least 10m from receptors, where possible

Operational Phase

- 6.5.4 No additional mitigation for the operation phase of the development are proposed.



Future baseline

- 6.5.5 The future baseline without the Proposed Development is likely to remain the same or similar to that currently present on Site in respect to Air Quality.

Construction Phase Assessment

Step 1

- 6.5.6 The undertaking of activities such as excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul road and highway surfaces.
- 6.5.7 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.
- 6.5.8 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Earthworks

- 6.5.9 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. Information on soil type was not available for the purpose of this assessment. As such, the soil type was considered to be potentially dusty in order to provide a worst-case scenario.
- 6.5.10 The Proposed Development site is estimated to cover a total area of greater than 10,000m². In accordance with the criteria outlined in Table 6.3, the magnitude of potential dust emissions from earthworks is therefore **large**.
- 6.5.11 Table 6.16 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 6.8, the development is considered to be a **high-risk** site for dust soiling as a result of earthworks activities. ^{xi}
- 6.5.12 Table 6.16 indicates the sensitivity of the area to human health is **low**. In accordance with the criteria outlined in Table 6.8, the development is considered to be a **low** risk site for human health as a result of earthwork activities.
- 6.5.13 Table 6.16 indicated the sensitivity of the area to ecological impacts are **high**. In accordance with the criteria outlined in Table 6.8, the development is considered to be a **high-risk** site for ecological impacts as a result of earthwork activities.

Construction

- 6.5.14 Due to the size of the development site the total building volume is likely to be greater than 100,000m³ to 100,000m³. In accordance with the criteria outlined in Table 6.3, the magnitude of potential dust emissions from construction is therefore **large**.
- 6.5.15 Table 6.16 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 6.3, the development is considered to be a **high-risk** site for dust soiling as a result of construction activities.

- 6.5.16 Table 6.16 indicates the sensitivity of the area to human health is **low**. In accordance with the criteria outlined in Table 6.8, the development is considered to be a **low** risk site for human health as a result of construction activities.
- 6.5.17 Table 6.16 indicates the sensitivity of the area to ecological impacts are **high**. In accordance with the criteria outlined in Table 6.8, the development is considered to be a **high-risk** site for ecological impacts as a result of construction activities.

Trackout

- 6.5.18 Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project.
- 6.5.19 Based on the site area, it is anticipated that the unpaved road length is likely to be greater than 100m. In accordance with the criteria outlined in Table 6.3 the magnitude of potential dust emissions from trackout is therefore **large**.
- 6.5.20 Table 6.16 indicates the sensitivity of the area to dust soiling effects to people and property is **high**. In accordance with the criteria outlined in Table 6.9, the development is considered to be a **high-risk** site for dust soiling as a result of trackout activities.
- 6.5.21 Table 6.16 indicates the sensitivity of the area to human health is **low**. In accordance within the criteria outlined in Table 6.9, the development is considered to be a **low** risk site for human health as a result of trackout activities.
- 6.5.22 Table 6.16 indicates the sensitivity of the area to ecological impacts are **high**. In accordance with the criteria outlined in Table 6.9, the development is considered to be a **high-risk** site for ecological impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

- 6.5.23 A summary of the risk from each dust generating activity is provided in Table 6.19.

Table 6.19 Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Low
Ecological	High	High	High

- 6.5.24 As indicated in Table 6.19, the potential risk of dust soiling is **medium** from earthworks, construction and trackout activities. The potential risk of human health impacts is **low** from earthworks, construction and trackout activities. The potential risk of ecological impacts is **high** from earthworks, construction and trackout.
- 6.5.25 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works



being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase

- 6.5.26 It should be noted that exhaust emissions associated with HGV movements during the construction phase of the proposed development have been considered. However, due to their transient and short-term nature associated impacts have been considered **not significant**. Further justification is provided within the EPUK and IAQM guidance^{vii}. The following criteria is provided to help establish when an air quality assessment is likely to be considered necessary:

- Proposals that will cause a change in HDV flows of more than 100 a day

- 6.5.27 It has been confirmed that the construction phase of the Proposed Development will generate 80 two-way HGV movements a day during the construction phase. As the above criteria is not met, air quality impacts associated with the construction phase of the proposed development are considered to be **not significant** and no further assessment is required.

Step 3

- 6.5.28 The IAQM^{vi} guidance provides a number of potential mitigation measures to reduce impacts during the construction phase. Following completion of the risk assessment, it has been determined that no additional measures, above those already considered within the submitted design, are required to reduce construction phase fugitive dust impacts. Specific measures are detailed in Table 6.18.

Step 4

- 6.5.29 Assuming the relevant mitigation measures outlined in Table 6.18 are implemented, the residual effect from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance^{vi}.

Operational Phase Assessment

- 6.5.30 Additional vehicle movements associated with the operation of the Proposed Development will generate exhaust emissions, such as NO₂ and PM₁₀, on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site.

- 6.5.31 The assessment considered the following scenarios:

- 2018 Verification
- 2025 DM Operational year;
- 2025 DS Operational year;
- 2035 DM year; and
- 2035 DS year.

- 6.5.32 The DM (i.e. without development) scenarios are representative of anticipated traffic data for 2025 and 2035 with the addition of committed development flows. The DS (i.e. with development) scenarios are representative of anticipated traffic data for 2025 and 2035 with the addition of predicted variations in traffic flow patterns as a result of the proposals, with the addition of committed development flows.

- 6.5.33 For the purpose of this assessment traffic data was supplied for the 2025 Operational Year and the 2035 Year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2016 were utilised within the dispersion model. The use of 2025 and 2035 traffic data in conjunction with 2016 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

- 6.5.34 Reference should be made to Appendix 6.2 for full assessment input details.

Nitrogen Dioxide

2025 Operational year Scenario

Predicted Concentrations at the Development Site

- 6.5.35 Annual mean NO₂ concentrations were predicted across the development site for the DS scenario, as shown in Figure 6.7 within Appendix 6.1. Predicted annual mean NO₂ concentrations across the development site during the DS scenario are summarised in Table 6.20.

Table 6.20 Predicted Concentrations at the Development Site

Elevation (m)	Predicted 2025 Annual Mean NO ₂ Concentration Range (µg/m ³)
Ground (1.5m)	20.40 – 34.91

- 6.5.36 Table 6.20 indicates there were no exceedances of the annual mean AQO across the entirety of the Proposed Development. As such, there is predicted to be no risk of exceedance of the annual mean AQO for NO₂ at proposed residential receptors.

- 6.5.37 Although annual mean NO₂ concentrations were close to exceeding the relevant AQO at areas in proximity to the A3 (M). It should be noted that annual mean NO₂ concentrations are predicted to be below the relevant AQO at all sensitive locations throughout the development with a maximum of 31.07µg/m³ at the most significantly affected sensitive receptor location. As such, it is considered that annual mean NO₂ levels at the development site should not be viewed as a constraint to development.

- 6.5.38 It is considered that NO₂ concentrations are likely to be lower at elevated heights due to increased distance from emission sources, such as road. Therefore, predicted concentrations at elevations above the ground floor level have not been included within this assessment.

- 6.5.39 Predictions of 1-hour NO₂ concentrations were not produced as part of the dispersion modelling assessment. However, as stated in LAQM (TG16)ⁱⁱ if annual mean NO₂ concentrations are below 60µg/m³ then it is unlikely that the 1-hour AQO will be exceeded. As such based on the results in Table 6.20, it is not predicted that concentration will exceed the 1 hour mean AQO for NO₂ across the development site.

- 6.5.40 Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated NO₂ concentrations.

Predicted Concentrations at Sensitive Receptors

- 6.5.41 Annual mean NO₂ concentrations were predicted at sensitive receptor locations for the 2025 DM and DS scenarios and are summarised in Table 6.21.

Table 6.21 Predicted Annual Mean NO₂ Concentrations

Sensitive Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	School - Havant and South Downs College	19.17	19.57	0.40
R2	Residential - 8 Downs Close	19.27	19.88	0.61



Sensitive Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R3	Residential - 3 Purbrook Way	26.63	27.00	0.37
R4	Residential - 10 Khandala Gardens	27.13	27.49	0.36
R5	Residential - Morelands Court	23.35	23.61	0.26
R6	Residential - Off Portdownhill Road	35.90	36.19	0.29
R7	Residential - Brooklands Road	36.05	36.33	0.28
R8	Residential - off Portsdownhill Road	36.01	36.28	0.27
R9	Residential - Delphi Way	18.29	18.70	0.41
R10	Residential - 7 Atlantis Avenue	19.18	19.61	0.43
R11	School- Crookhorn College of Technology	20.06	20.26	0.20
R12	Residential - 12 Portsdown Hill Road	29.46	29.65	0.19
R13	Residential - Bedhampton Road	30.63	30.80	0.17
R14	Residential - Bedhampton Hill Road	31.07	31.19	0.12
R15	Residential - 41 Portsdownhill Road	27.68	27.84	0.16
R16	Residential - 22 Crookhorn Lane	20.38	20.48	0.10
R17	Residential - 72 Stokes Road	20.90	21.02	0.12
R18	Residential - 238 Stakes Hill Road	23.30	23.54	0.24
R19	Residential - 126 London Road	22.66	22.73	0.07
R20	Residential - 66 London Road	24.57	24.65	0.08
R21	Residential - 106 London Road	22.48	22.54	0.06
R22	Residential - 183 Park Avenue	20.65	20.75	0.10
R23	Residential - Glebe Park Avenue	32.71	32.92	0.21
R24	Residential - Glebe Park Avenue	33.19	33.40	0.21
R25	Residential - Glebe Park Avenue	36.21	36.45	0.24
R26	Residential - 48 Auriol Drive	33.26	33.32	0.06
R27	Residential - 379 Havant Road	30.36	30.40	0.04
R28	Residential - 325 Havant Road	30.32	30.35	0.03

6.5.42 As indicated in Table 6.21, predicted annual mean NO₂ concentrations were predicted to be below the annual mean AQO for NO₂ at all twenty-eight sensitive receptor locations considered in both scenarios.

6.5.43 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 6.22.

Table 6.22 Predicted NO₂ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	School - Havant and South Downs College	1.00	75% or Less of AQO	Negligible
R2	Residential - 8 Downs Close	1.53	75% or Less of AQO	Negligible
R3	Residential - 3 Purbrook Way	0.93	75% or Less of AQO	Negligible
R4	Residential - 10 Khandala Gardens	0.90	75% or Less of AQO	Negligible
R5	Residential - Morelands Court	0.65	75% or Less of AQO	Negligible
R6	Residential - Off Portdownhill Road	0.72	76-94% of AQO	Negligible
R7	Residential - Brooklands Road	0.70	76-94% of AQO	Negligible
R8	Residential - off Portsdownhill Road	0.68	76-94% of AQO	Negligible
R9	Residential - Delphi Way	1.03	75% or Less of AQO	Negligible
R10	Residential - 7 Atlantis Avenue	1.08	75% or Less of AQO	Negligible
R11	School - Crookhorn College of Technology	0.50	75% or Less of AQO	Negligible
R12	Residential - 12 Portsdown Hill Road	0.47	75% or Less of AQO	Negligible
R13	Residential - Bedhampton Road	0.43	76-94% of AQO	Negligible
R14	Residential - Bedhampton Hill Road	0.30	76-94% of AQO	Negligible
R15	Residential - 41 Portsdownhill Road	0.40	75% or Less of AQO	Negligible
R16	Residential - 22 Crookhorn Lane	0.25	75% or Less of AQO	Negligible
R17	Residential - 72 Stokes Road	0.30	75% or Less of AQO	Negligible
R18	Residential - 238 Stakes Hill Road	0.60	75% or Less of AQO	Negligible
R19	Residential - 126 London Road	0.18	75% or Less of AQO	Negligible
R20	Residential - 66 London Road	0.20	75% or Less of AQO	Negligible
R21	Residential - 106 London Road	0.15	75% or Less of AQO	Negligible
R22	Residential - 183 Park Avenue	0.25	75% or Less of AQO	Negligible
R23	Residential - Glebe Park Avenue	0.53	76-94% of AQO	Negligible
R24	Residential - Glebe Park Avenue	0.53	76-94% of AQO	Negligible
R25	Residential - Glebe Park Avenue	0.60	76-94% of AQO	Negligible



Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R26	Residential - 48 Auriol Drive	0.15	76-94% of AQO	Negligible
R27	Residential - 379 Havant Road	0.10	76-94% of AQO	Negligible
R28	Residential - 325 Havant Road	0.08	75% or Less of AQO	Negligible

6.5.44 As indicated in Table 6.22, the impacts on annual mean NO₂ concentrations as a result of the development were predicted to be **negligible** at all twenty-eight sensitive receptor locations.

2035 Opening Year Scenario

Predicted Concentrations at the Development Site

6.5.45 Annual mean NO₂ concentrations were predicted across the development site for the DS scenario, as shown in Figure 6.9 within Appendix 6.1. Predicted annual mean NO₂ concentrations across the development site during the DS scenario are summarised in Table 6.23

Table 6.23 Predicted Annual Mean NO₂ Concentrations at the Development Site

Elevation (m)	Predicted 2035 Annual Mean NO ₂ Concentration Range (µg/m ³)
Ground (1.5m)	20.15 – 33.35

6.5.46 Table 6.23 indicates there were no exceedances of the annual mean AQO across the entirety of the Proposed Development. As such, there is predicted to be no risk of exceedance of the annual mean AQO for NO₂ at proposed residential receptors.

6.5.47 It is considered that NO₂ concentrations are likely to be lower at elevated heights due to increased distance from emission sources, such as road. Therefore, predicted concentrations at elevations above the ground floor level have not been included within this assessment.

6.5.48 Predictions of 1-hour NO₂ concentrations were not produced as part of the dispersion modelling assessment. However, as stated in LAQM (TG16)ⁱⁱ if annual mean NO₂ concentrations are below 60µg/m³ then it is unlikely that the 1-hour AQO will be exceeded. As such based on the results in Table 6.23 it is not predicted that concentration will exceed the 1 hour mean AQO for NO₂ across the development site.

6.5.49 Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated NO₂ concentrations.

Predicted Concentrations at Sensitive Receptors

6.5.50 Annual mean NO₂ concentrations were predicted at sensitive receptor locations for the 2035 DM and DS scenarios and are summarised in Table 6.24.

Table 6.24 Predicted Annual Mean NO₂ Concentrations.

Sensitive Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Educational - Havant and South Downs College	18.79	19.35	0.56
R2	Residential - 8 Downs Close	18.87	19.80	0.93
R3	Residential - 3 Purbrook Way	25.46	26.04	0.58
R4	Residential - 10 Khandala Gardens	25.90	26.47	0.57
R5	Residential - Morelands Court	22.51	22.89	0.38
R6	Residential - Off Portdownhill Road	34.38	34.86	0.48
R7	Residential - Brooklands Road	34.53	35.01	0.48
R8	Residential - off Portsdownhill Road	34.51	34.97	0.46
R9	Residential - Delphi Way	17.99	18.64	0.65
R10	Residential - 7 Atlantis Avenue	18.89	19.57	0.68
R11	Educational - Crookhorn College of Technology	19.57	19.83	0.26
R12	Residential - 12 Portsdown Hill Road	28.52	28.82	0.30
R13	Residential - Bedhampton Road	29.44	29.70	0.26
R14	Residential - Bedhampton Hill Road	29.94	30.13	0.19
R15	Residential - 41 Portsdownhill Road	26.87	27.12	0.25
R16	Residential - 22 Crookhorn Lane	19.86	19.98	0.12
R17	Residential - 72 Stokes Road	20.34	20.52	0.18
R18	residential - 238 Stakes Hill Road	22.49	22.85	0.36
R19	Residential - 126 London Road	21.92	22.09	0.17
R20	Residential - 66 London Road	23.51	23.75	0.24
R21	Residential - 106 London Road	21.76	21.92	0.16
R22	Residential - 183 Park Avenue	20.10	20.27	0.17
R23	Residential - Glebe Park Avenue	31.47	31.83	0.36
R24	Residential - Glebe Park Avenue	31.91	32.27	0.36
R25	Residential - Glebe Park Avenue	34.65	35.06	0.41
R26	Residential - 48 Auriol Drive	32.32	32.41	0.09



Sensitive Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R27	Residential - 379 Havant Road	29.45	29.50	0.05
R28	Residential - 325 Havant Road	29.40	29.45	0.05

6.5.51 As indicated in Table 6.24, predicted annual mean NO₂ concentrations were predicted to be below the annual mean AQO for NO₂ at all twenty-eight sensitive receptor locations considered in both scenarios.

6.5.52 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 6.25.

Table 6.25 Predicted NO₂ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Educational - Havant and South Downs College	1.40	75% or Less of AQO	Negligible
R2	Residential - 8 Downs Close	2.33	75% or Less of AQO	Negligible
R3	Residential - 3 Purbrook Way	1.45	75% or Less of AQO	Negligible
R4	Residential - 10 Khandala Gardens	1.43	75% or Less of AQO	Negligible
R5	Residential - Morelands Court	0.95	75% or Less of AQO	Negligible
R6	Residential - Off Portdownhill Road	1.20	76-94% of AQO	Negligible
R7	Residential - Brooklands Road	1.20	76-94% of AQO	Negligible
R8	Residential - off Portsdownhill Road	1.15	76-94% of AQO	Negligible
R9	Residential - Delphi Way	1.63	75% or Less of AQO	Negligible
R10	Residential - 7 Atlantis Avenue	1.70	75% or Less of AQO	Negligible
R11	Educational - Crookhorn College of Technology	0.65	75% or Less of AQO	Negligible
R12	Residential - 12 Portsdown Hill Road	0.75	75% or Less of AQO	Negligible
R13	Residential - Bedhampton Road	0.65	75% or Less of AQO	Negligible
R14	Residential - Bedhampton Hill Road	0.47	75% or Less of AQO	Negligible
R15	Residential - 41 Portsdownhill Road	0.63	75% or Less of AQO	Negligible
R16	Residential - 22 Crookhorn Lane	0.30	75% or Less of AQO	Negligible
R17	Residential - 72 Stokes Road	0.45	75% or Less of AQO	Negligible
R18	residential - 238 Stakes Hill Road	0.90	75% or Less of AQO	Negligible

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R19	Residential - 126 London Road	0.42	75% or Less of AQO	Negligible
R20	Residential - 66 London Road	0.60	75% or Less of AQO	Negligible
R21	Residential - 106 London Road	0.40	75% or Less of AQO	Negligible
R22	Residential - 183 Park Avenue	0.42	75% or Less of AQO	Negligible
R23	Residential - Glebe Park Avenue	0.90	76-94% of AQO	Negligible
R24	Residential - Glebe Park Avenue	0.90	76-94% of AQO	Negligible
R25	Residential - Glebe Park Avenue	1.03	76-94% of AQO	Negligible
R26	Residential - 48 Auriol Drive	0.22	76-94% of AQO	Negligible
R27	Residential - 379 Havant Road	0.13	75% or Less of AQO	Negligible
R28	Residential - 325 Havant Road	0.13	75% or Less of AQO	Negligible

6.5.53 As indicated in Table 6.25, the impacts on annual mean NO₂ concentrations as a result of the development were predicted to be **negligible** at all twenty-eight sensitive receptor locations.

Particulate Matter – PM₁₀

2025 Operational Year Scenario

Predicted Concentrations at the Development Site

6.5.54 Annual mean PM₁₀ concentrations were predicted across the development site for the DS scenario, as shown in Figure 6.8 within Appendix 6.1. Predicted annual mean PM₁₀ concentrations across the development site during the DS scenario are summarised in Table 6.26.

Table 6.26 Predicted Annual Mean PM₁₀ Concentrations at the Development Site

Floor	Predicted 2025 Annual Mean PM ₁₀ Concentration Range (µg/m ³)
Ground (1.5m)	15.77 – 20.01

6.5.55 The predicted concentrations shown in Table 6.26 indicate that there were no exceedances of the AQO throughout the modelling area.

6.5.56 Similar to NO₂, it is considered that PM₁₀ concentrations are likely to be lower at elevated heights due to increased distance from road emission sources. Therefore, predicted concentrations at elevations above the ground floor level have not been included within this assessment.



6.5.57 Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated PM₁₀ concentrations.

Predicted Concentrations at Sensitive Receptors

6.5.58 Annual mean PM₁₀ concentrations were predicted at sensitive receptor locations for each scenario and are summarised in Table 6.27.

Table 6.27 Predicted Annual Mean PM₁₀ Concentrations

Sensitive Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Educational - Havant and South Downs College	15.57	15.69	0.12
R2	Residential - 8 Downs Close	15.61	15.80	0.19
R3	Residential - 3 Purbrook Way	17.51	17.61	0.10
R4	Residential - 10 Khandala Gardens	17.57	17.67	0.10
R5	Residential - Morelands Ct	16.59	16.66	0.07
R6	Residential - Off Portdownhill Road	20.20	20.29	0.09
R7	Residential - Brooklands Road	20.22	20.31	0.09
R8	Residential - off Portsdownhill Road	20.21	20.29	0.08
R9	Residential - Delphi Way	15.34	15.46	0.12
R10	Residential - 7 Atlantis Avenue	15.33	15.46	0.13
R11	Educational - Crookhorn College of Technology	15.75	15.81	0.06
R12	Residential - 12 Portsdown Hill Road	18.16	18.22	0.06
R13	Residential - Bedhampton Road	18.73	18.78	0.05
R14	Residential - Bedhampton Hill Road	18.66	18.70	0.04
R15	Residential - 41 Portsdownhill Road	17.81	17.86	0.05
R16	Residential - 22 Crookhorn Lane	15.82	15.85	0.03
R17	Residential - 72 Stokes Road	15.95	15.98	0.03
R18	residential - 238 Stakes Hill Road	16.58	16.64	0.06
R19	Residential - 126 London Road	16.39	16.40	0.01
R20	Residential - 66 London Road	17.46	17.48	0.02
R21	Residential - 106 London Road	16.35	16.37	0.02

Sensitive Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R22	Residential - 126 London Road	15.88	15.90	0.02
R23	Residential - 66 London Road	19.20	19.27	0.07
R24	Residential - 106 London Road	19.34	19.41	0.07
R25	Residential - 126 London Road	20.26	20.33	0.07
R26	Residential - 66 London Road	19.33	19.35	0.02
R27	Residential - 106 London Road	18.92	18.93	0.01
R28	Residential - 126 London Road	18.91	18.92	0.01

6.5.59 As indicated in Table 6.27, annual mean PM₁₀ concentrations were below the annual mean AQO for PM₁₀ at all twenty-eight sensitive receptor locations for both scenarios considered.

6.5.60 Predicted impacts on annual mean PM₁₀ concentrations are summarised in Table 6.28

Table 6.28 Predicted PM₁₀ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Educational - Havant and South Downs College	0.30	75% or Less of AQO	Negligible
R2	Residential - 8 Downs Close	0.48	75% or Less of AQO	Negligible
R3	Residential - 3 Purbrook Way	0.25	75% or Less of AQO	Negligible
R4	Residential - 10 Khandala Gardens	0.25	75% or Less of AQO	Negligible
R5	Residential - Morelands Ct	0.18	75% or Less of AQO	Negligible
R6	Residential - Off Portdownhill Road	0.23	75% or Less of AQO	Negligible
R7	Residential - Brooklands Road	0.23	75% or Less of AQO	Negligible
R8	Residential - off Portsdownhill Road	0.20	75% or Less of AQO	Negligible
R9	Residential - Delphi Way	0.30	75% or Less of AQO	Negligible
R10	Residential - 7 Atlantis Avenue	0.33	75% or Less of AQO	Negligible
R11	Educational - Crookhorn College of Technology	0.15	75% or Less of AQO	Negligible
R12	Residential - 12 Portsdown Hill Road	0.15	75% or Less of AQO	Negligible
R13	Residential - Bedhampton Road	0.13	75% or Less of AQO	Negligible
R14	Residential - Bedhampton Hill Road	0.10	75% or Less of AQO	Negligible



Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R15	Residential - 41 Portsdownhill Road	0.13	75% or Less of AQO	Negligible
R16	Residential - 22 Crookhorn Lane	0.07	75% or Less of AQO	Negligible
R17	Residential - 72 Stokes Road	0.08	75% or Less of AQO	Negligible
R18	residential - 238 Stakes Hill Road	0.15	75% or Less of AQO	Negligible
R19	Residential - 126 London Road	0.02	75% or Less of AQO	Negligible
R20	Residential - 66 London Road	0.05	75% or Less of AQO	Negligible
R21	Residential - 106 London Road	0.05	75% or Less of AQO	Negligible
R22	Residential - 183 Park Avenue	0.05	75% or Less of AQO	Negligible
R23	Residential - Glebe Park Avenue	0.18	75% or Less of AQO	Negligible
R24	Residential - Glebe Park Avenue	0.18	75% or Less of AQO	Negligible
R25	Residential - Glebe Park Avenue	0.17	75% or Less of AQO	Negligible
R26	Residential - 48 Auriol Drive	0.05	75% or Less of AQO	Negligible
R27	Residential - 379 Havant Road	0.02	75% or Less of AQO	Negligible
R28	Residential - 325 Havant Road	0.03	75% or Less of AQO	Negligible

6.5.61 As indicated in Table 6.28 impacts on annual mean PM₁₀ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be negligible at all twenty-eight sensitive receptor locations.

Table 6.29 Predicted 2035 Annual Mean PM₁₀ Concentrations at the Development Site

Floor	Predicted 2035 Annual Mean PM ₁₀ Concentration Range (µg/m ³)
Ground (1.5m)	15.83 – 20.33

6.5.62 The predicted concentrations shown in Table 6.29 indicate that there were no exceedances of the AQO throughout the modelling area.

6.5.63 Similar to NO₂, it is considered that PM₁₀ concentrations are likely to be lower at elevated heights due to increased distance from emission sources, such as road. Therefore, predicted concentrations at elevations above the ground floor level have not been included within this assessment.

6.5.64 Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated PM₁₀ concentrations.

Predicted Concentrations at Sensitive Receptors

6.5.65 Annual mean PM₁₀ concentrations were predicted at sensitive receptor locations for each scenario and are summarised in Table 6.30.

Table 6.30 Predicted Annual Mean PM₁₀ Concentrations

Sensitive Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Educational - Havant and South Downs College	15.63	15.83	0.20
R2	Residential - 8 Downs Close	15.67	16.02	0.35
R3	Residential - 3 Purbrook Way	17.70	17.90	0.20
R4	Residential - 10 Khandala Gardens	17.77	17.96	0.19
R5	Residential - Morelands Ct	16.72	16.84	0.12
R6	Residential - Off Portsdownhill Road	20.49	20.67	0.18
R7	Residential - Brooklands Road	20.51	20.68	0.17
R8	Residential - off Portsdownhill Road	20.50	20.67	0.17
R9	Residential - Delphi Way	15.38	15.62	0.24
R10	Residential - 7 Atlantis Avenue	15.37	15.63	0.26
R11	Educational - Crookhorn College of Technology	15.83	15.91	0.08
R12	Residential - 12 Portsdown Hill Road	18.32	18.42	0.10
R13	Residential - Bedhampton Road	18.93	19.02	0.09
R14	Residential - Bedhampton Hill Road	18.85	18.91	0.06
R15	Residential - 41 Portsdownhill Road	17.94	18.03	0.09
R16	Residential - 22 Crookhorn Lane	15.90	15.94	0.04
R17	Residential - 72 Stokes Road	16.03	16.09	0.06
R18	residential - 238 Stakes Hill Road	16.71	16.82	0.11
R19	Residential - 126 London Road	16.50	16.56	0.06
R20	Residential - 66 London Road	17.64	17.72	0.08
R21	Residential - 106 London Road	16.47	16.52	0.05
R22	Residential - 126 London Road	15.96	16.01	0.05
R23	Residential - 66 London Road	19.42	19.55	0.13
R24	Residential - 106 London Road	19.57	19.70	0.13
R25	Residential - 126 London Road	20.54	20.69	0.15



Sensitive Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R26	Residential - 66 London Road	19.50	19.54	0.04
R27	Residential - 106 London Road	19.08	19.10	0.02
R28	Residential - 126 London Road	19.08	19.09	0.01

6.5.66 As indicated in Table 6.30, annual mean PM₁₀ concentrations were below the annual mean AQO for PM₁₀ at all twenty-eight sensitive receptor locations for both scenarios considered.

6.5.67 Predicted impacts on annual mean PM₁₀ concentrations are summarised in Table 6.31.

Table 6.31 Predicted PM₁₀ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Educational - Havant and South Downs College	0.50	75% or Less of AQO	Negligible
R2	Residential - 8 Downs Close	0.87	75% or Less of AQO	Negligible
R3	Residential - 3 Purbrook Way	0.50	75% or Less of AQO	Negligible
R4	Residential - 10 Khandala Gardens	0.48	75% or Less of AQO	Negligible
R5	Residential - Morelands Court	0.30	75% or Less of AQO	Negligible
R6	Residential - Off Portsdownhill Road	0.45	75% or Less of AQO	Negligible
R7	Residential - Brooklands Road	0.42	75% or Less of AQO	Negligible
R8	Residential - off Portsdownhill Road	0.43	75% or Less of AQO	Negligible
R9	Residential - Delphi Way	0.60	75% or Less of AQO	Negligible
R10	Residential - 7 Atlantis Avenue	0.65	75% or Less of AQO	Negligible
R11	Educational - Crookhorn College of Technology	0.20	75% or Less of AQO	Negligible
R12	Residential - 12 Portsdown Hill Road	0.25	75% or Less of AQO	Negligible
R13	Residential - Bedhampton Road	0.23	75% or Less of AQO	Negligible
R14	Residential - Bedhampton Hill Road	0.15	75% or Less of AQO	Negligible
R15	Residential - 41 Portsdownhill Road	0.23	75% or Less of AQO	Negligible

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R16	Residential - 22 Crookhorn Lane	0.10	75% or Less of AQO	Negligible
R17	Residential - 72 Stokes Road	0.15	75% or Less of AQO	Negligible
R18	residential - 238 Stakes Hill Road	0.27	75% or Less of AQO	Negligible
R19	Residential - 126 London Road	0.15	75% or Less of AQO	Negligible
R20	Residential - 66 London Road	0.20	75% or Less of AQO	Negligible
R21	Residential - 106 London Road	0.13	75% or Less of AQO	Negligible
R22	Residential - 183 Park Avenue	0.13	75% or Less of AQO	Negligible
R23	Residential - Glebe Park Avenue	0.32	75% or Less of AQO	Negligible
R24	Residential - Glebe Park Avenue	0.32	75% or Less of AQO	Negligible
R25	Residential - Glebe Park Avenue	0.38	75% or Less of AQO	Negligible
R26	Residential - 48 Auriol Drive	0.10	75% or Less of AQO	Negligible
R27	Residential - 379 Havant Road	0.05	75% or Less of AQO	Negligible
R28	Residential - 325 Havant Road	0.03	75% or Less of AQO	Negligible

6.5.68 As indicated in Table 6.31, impacts on annual mean PM₁₀ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all twenty-eight sensitive receptor locations.

Particulate Matter – PM_{2.5}

6.5.69 PM_{2.5} has not been modelled within the assessment as the predicted concentrations relating to annual mean PM₁₀ remain below the AQO for PM_{2.5} (25 µg/m³).

6.5.70 Since PM₁₀ contains all particulate matter with an aerodynamic diameter of less than 10µm, PM_{2.5} is effectively accounted for within these predictions; and at worst could be considered that PM_{2.5} concentrations would be equal to the predicted PM₁₀ concentrations.

6.6 Likely Significant Environmental Effects of the Scheme

Construction

6.6.1 The overall impact of the Construction Phase Assessment Mitigation was determined as **not significant** assuming the relevant mitigation measures submitted within the scheme design are implemented,



Operational

- 6.6.2 The overall significance of operational phase road traffic emission impacts was determined as **not significant**. This was based on the predicted impacts at discrete receptor locations and the considerations outlined in Section 3. Further justification is provided in Table 6.32.

Table 6.32 Overall Road Traffic Exhaust Emission Impact Significance

Guidance	Comment
Number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance	Impacts on annual mean NO ₂ and PM ₁₀ concentrations were predicted to be negligible at all sensitive receptors in both the 2025 Operational Year and the 2035 Opening Year Scenarios. The sensitive locations represent worst-case locations and therefore it is unlikely that any other receptors would be significantly affected by the proposed development.
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	The proposed development will not result in any new exposure to pollutant concentrations above the AQOs at sensitive locations
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	The maximum changes in annual mean NO ₂ and PM ₁₀ concentrations relative to their respective AQOs were predicted to be 1.53% and 0.48% respectively in the 2025 Operational year scenario. The maximum changes in annual mean NO ₂ and PM ₁₀ concentrations relative to their respective AQOs were predicted to be 2.33% and 0.87% respectively in the 2035 Opening year scenario. As such, resultant impacts on annual mean NO ₂ and PM ₁₀ concentrations were predicted to be negligible at all sensitive receptor locations
Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease	There were exceedances of the annual mean AQO for NO ₂ at non-sensitive locations within the modelling extents, mostly along the A3 Corridor in both the 2025 operational year and the 2035 opening year scenarios. There were no exceedances of the annual mean AQO for PM ₁₀ at any location within the modelling extent in both the 2025 operational year and the 2035 opening year scenarios.
The extent to which an objective is exceeded e.g. an annual mean NO ₂ concentration of 41µg/m ³ should attract less significance than an annual mean of 51µg/m ³	There were no exceedances of the annual mean AQO for NO ₂ and PM ₁₀ at any sensitive receptor location within the modelling extent

6.7 Additional Mitigation, Compensation and Enhancement Measures

- 6.7.1 There are a number of air quality mitigation options available to reduce the potential exposure of future users to elevated pollutant concentrations or off-set wider impacts associated with the proposed development.

Construction Phase

- 6.7.2 No further measures are required. It is assumed that the implementation of measures provided within the submitted design, as detailed in Table 6.18, will ensure that Construction Phase impacts are **not significant**.

Operational Phase

- 6.7.3 Based on the results of the dispersion modelling assessment, there were no exceedances of the relevant AQOs at any sensitive receptor locations during the DS scenarios. The Proposed Development is therefore considered to be suitable for the proposed end use without the implementation of mitigation techniques to protect future residents from elevated NO₂ and PM₁₀ concentrations.
- 6.7.4 Based on the screening assessment undertaken in Section 6.4.19 to 6.4.24 there may be requirement to implement further mitigation regarding ecological receptors.

6.8 Assessment Summary and Likely Significant Residual Environmental Effects

- 6.8.1 Residual effects are defined as those that remain following the implementation of mitigation. Residual effects on air quality for the Proposed Development are outlined in the following Sections.

Construction Phase

Assuming the relevant mitigation measures outlined in Table 6.18 are implemented, the residual effect from all dust generation activities is predicted to be **negligible** and therefore **not significant**.

Operational Phase

- 6.8.2 Predicted impacts on NO₂ and PM₁₀ concentrations as a result of the operational phase were predicted to be **negligible** and therefore **not significant** at all sensitive receptor locations, in the operational phase scenario within the vicinity of the site. As such, no further mitigation techniques are required to further reduce the already **negligible** impacts associated with the proposed developments.

Climate Change

- 6.8.3 Importantly, emissions in the UK associated with road vehicles are predicted to decrease significantly in the forthcoming decades and therefore the impact on climate change from these sources will dissipate.



Conclusions

- 6.8.4 The Proposed Development has the potential to cause air quality impacts during both the construction and operational phases.
- 6.8.5 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **negligible**.
- 6.8.6 Dispersion modelling was undertaken in order to predict air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the development. Results were subsequently verified using monitoring results obtained from NBC. The dispersion modelling results indicated that pollutant levels across the site were below the relevant AQOs. The location is therefore considered suitable for residential use without the inclusion of mitigation methods to protect future users from poor air quality.
- 6.8.7 Predicted impacts on annual mean NO₂ and PM₁₀ concentrations as a result of operational phase exhaust emissions were predicted to be negligible at all twenty-eight sensitive receptor locations within the vicinity of the site. The overall significance of potential impacts was determined to be **not significant**, in accordance with the EPUK and IAQM guidance.
- 6.8.8 Whilst associated impacts were predicted to be not-significant, it is recommended that good practice measures should be discussed and where viable implemented on Site to offset additional emissions. In line with the EPUK and IAQM Planning for Air Quality Guidance, such measures include:
- The provision of a detailed travel plan which sets out measures to encourage sustainable means of transport (public, cycling and walking);
 - Improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
 - Support for and promotion of car clubs;
 - Contributions to low emission vehicle refuelling infrastructure;
 - Provision of incentives for the uptake of low emission vehicles;
 - Improvements to cycling and walking infrastructure; and,
 - Green infrastructure/landscaping, such as additional planting or green walls utilising species that would aid absorption of pollutants; (Field Maple (*Acer campestre*), Crab Apple and Rowan).



Table 6.33 Assessment Summary and Residual Environmental Effects (Air Quality)

Summary description of the identified impact	Sensitivity of Receptor	Impact Magnitude	Significance and Nature of Effect	Additional Mitigation	Residual Impact Magnitude	Residual Significance and Nature of Effect	Confidence Level
Construction							
Dust Soiling, Human Health and Amenity	High	Negligible	Not-significant	Not Required, impacts mitigated within the submitted design outlined in Table 6.18	Negligible	Negligible dust impacts to property and people	High
Ecological	High	Negligible	Not-significant	Not Required, impacts mitigated within the submitted design outlined in Table 6.18	Negligible	Negligible dust impacts to ecological receptors	High
Operation							
Human Health and Amenity	High	Negligible	Not-significant	Best Practice Measures	Negligible	Negligible	High



6.9 Glossary

Term	Definition
AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
CEMP	Construction Environmental Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do Something
EPUK	Environmental Protection UK
EU	European Union

Term	Definition
HBC	Havant Borough Council
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LCC	Lancaster City Council
NGR	National Grid Reference
NO2	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
REC	Resource and Environmental Consultants
TEMPRO	Trip End Model Presentation Program
Z ₀	Roughness Length



6.1 References

ⁱ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

ⁱⁱ Local Air Quality Management Technical Guidance 2016 LAQM (TG16), DEFRA, 2018

ⁱⁱⁱ <http://planningguidance.planningportal.gov.uk/>.

^{iv} Draft Havant Borough Local Plan 2036

^v Havant Borough Core Strategy, 2011

^{vi} Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, 2014.

^{vii} Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2015

^{viii} Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

^{ix} <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>.