Air Quality Assessment

Land West of Bines Road, Partridge Green

October 2024

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1. Introduction

Background

1.1 Phlorum Limited has been commissioned by Strutt and Parker, on behalf of Croudace Homes Limited, to undertake an Air Quality Assessment (AQA) for a proposed residential development located on a parcel of land west of Bines Road, Partridge Green, Horsham. The National Grid Reference for the centre of the site is 518815,118680. A site location plan is included in Figure 1.

1.2 The proposed development comprises the construction of 101 new residential dwellings, with associated roads, parking and landscaping.

1.3 Land use in the vicinity of the site comprises predominantly residential, agricultural and commercial uses. Residential uses bound sections of the north and eastern boundary, with commercial uses directly to the east of the site. Agricultural uses bound the site to the south and greenspaces cover a majority of land directly north and west of the site.

1.4 The main sources of air pollution in the vicinity of the site are vehicles travelling on the local road network, particularly the B2135 Bines Road, which bounds the application site to the east.

1.5 Horsham District Council (HDC), the Local Planning Authority (LPA), have declared two Air Quality Management Areas (AQMAs) within the district; Horsham AQMA No.1 and Horsham Cowfold AQMA. The closest of these, Horsham Cowfold AQMA, is located 4.3km to the north-east of the application site and was established in 2011 due to exceedances of the annual mean Air Quality Standard (AQS) for nitrogen dioxide (NO_2).

Scope of Assessment

1.6 This AQA evaluates the proposed development's sensitivity to, and impact on, local air quality, considering both operational and construction phases, recommending mitigation where necessary.

1.7 The AQA also assesses the potential for dust nuisance and soiling impacts to occur due to the construction of the proposed development, offering recommendations for site-specific mitigation measures to reduce the possibility of such impacts occurring.

1.8 An Emissions Mitigation Assessment has also been undertaken, in line with local guidance, to establish the 'emissions cost' and whether proposed mitigation measures are projected to off-set the calculated 'emission cost' and sufficiently mitigate the impacts of operational emissions.

2. Policy Context

The UK Air Quality Strategy

2.1 The UK Air Quality Strategy (UKAQS)[1] sets out air quality standard (AQS) concentrations for a number of key pollutants that are to be achieved at sensitive receptor locations across the UK by corresponding air quality objective (AQO) dates. The sensitive locations at which the standards and objectives apply are those where the population are reasonably expected to be exposed to said pollutants over the particular averaging period.

2.2 For those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to compare concentrations against the standards are areas of residential housing. It is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time.

2.3 Schools and children's playgrounds are also often used as sensitive locations for comparison with annual mean objectives due to the increased sensitivity of young people to the effects of pollution (regardless of whether or not their exposure to the pollution could be over an annual period). For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time. A summary of the AQSs and AQOs relevant to this assessment are included in Table 2.1, below.

Table 2.1: UK Air Quality Standards and Objectives

Pollutant	Averaging Period	Air Quality Standard (µg.m^{-3})	Air Quality Objective
Nitrogen dioxide (NO_2)	1 hour	200	200 µg.m^{-3} not to be exceeded more than 18 times a year
	Annual	40	40 µg.m^{-3}
Particulate Matter (PM_{10})	24-hour	50	50 µg.m^{-3} not to be exceeded more than 35 times a year
	Annual	40	40 µg.m^{-3}
Particulate Matter ($PM_{2.5}$)	Annual	20	20 µg.m^{-3}

1 Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2) July 2007.

2.4 The objectives adopted in the UK are based on the Air Quality (England) Regulations 2000[2], as amended, for the purpose of Local Air Quality Management. These Air Quality Regulations have been adopted into UK law from the limit values required by European Union Daughter Directives on air quality.

2.5 The UKAQS for $PM_{2.5}$ was amended as part of The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[3].

2.6 Obligations under the Environment Act 1995 require local authorities to declare an AQMA at sensitive receptor locations where an objective concentration has been predicted to be exceeded. In setting an AQMA, the local authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the objective levels.

2.7 Air quality is managed locally by HDC, who have declared two AQMAs within their authoritative boundary; the Horsham AQMA No.1 and the Horsham Cowfold AQMA. These AQMAs are located 10.6km south-west and 4.3km to the north-east of the application site, respectfully. These are located The declaration of these AQMAs resulted in the formulation of two Air Quality Action Plans (AQAP), the Storrington AQAP[4] and the Cowfold AQAP[5] in an effort to improve air quality in and around the AQMAs.

National Planning Policy Framework

2.8 The *National Planning Policy Framework* (NPPF)[6], which was updated in December 2023, sets out the Government's planning policy for England. At its heart is an intention to promote more sustainable development. Regarding this, the NPPF states at paragraph 109:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."

2 The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.
3 The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.
4 Horsham District Council. (2012). *Storrington Air Quality Action Plan*. Available at: Storrington air quality management area | Horsham District Council
5 Horsham District Council. (2011). *Detailed assessment Report Cowfold Air Quality*. Available at: Detailed Assessment Report of Cowfold Air Quality 2011 (horsham.gov.uk)
6 Ministry of Housing, Communities & Local Government. (2023). *National Planning Policy Framework.*

2.9 A core principle in the NPPF that relates to air quality effects from development is that planning should "contribute to conserve and enhance the natural and local environment" as demonstrated at paragraph 180:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*

2.10 The NPPF goes on to state the following at paragraph 191:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or wider area to impacts that could arise from the development."

2.11 With regard to a compliance with relevant limit values and national objectives for air pollutants, along with assessing cumulative effects the NPPF states the following at paragraph 192:

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

2.12 Regarding potential adverse impacts generated by development, the NPPF states the following:

> *"[...] Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

2.13 The NPPF offers a broad framework but does not afford a detailed methodology for assessments. Specific guidance for air quality continues to be provided by organisations such as the Department for Environment, Food and Rural Affairs (Defra), Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM).

National Planning Practice Guidance

2.14 Reference ID 32 (Air Quality) of the *National Planning Practice Guidance* (PPG)[7] , which was updated in February 2024, provides guiding principles on how planning can take account of the impact of new development on air quality. The PPG summarises the importance of air quality in planning and the key legislation relating to it.

2.15 As well as describing the importance of International, National and Local Policies (detailed elsewhere in this report), it summarises the key sources of air quality information. It also explains when air quality is likely to be relevant to a planning decision, stating:

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

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*

- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*

- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*

7 Ministry of Housing, Communities & Local Government. (2024). *Planning Practice Guidance*.

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

2.16 Details are also provided of what should be included within an air quality assessment. Key considerations include:

- Baseline local air quality;
- Whether the proposed development could significantly affect local air quality during construction/operation; and
- Whether the development is likely to expose more people to poor air quality.

2.17 Examples of potential air quality mitigation measures are also provided in the PPG.

Local Planning Policy

2.1 The Horsham District Planning Framework (2015)[8] currently directs land use planning within the district. Within this document are policies of relevance to air quality, including:

Policy 24: Environmental Protection:

"The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they: […]

4. *Minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment;*
5. *Contribute to the implementation of local Air Quality Action Plans and do not conflict with its objectives;*
6. *Maintain or reduce the number of people exposed to poor air quality including odour. Consideration should be given to development that will result in new public exposure, particularly where vulnerable people (e.g. the elderly, care homes or schools) would be exposed to the areas of poor air quality; and*
7. *Ensure that the cumulative impact of all relevant committed developments is appropriately assessed".*

8 Horsham District Council. (2015). *Horsham District Planning Framework*. Available at: Horsham District Planning Framework 2015

Policy 33: Development Principes:

"In order to conserve and enhance the natural and built environment developments shall be required to: […]

Ensure that it is designed to avoid unacceptable harm to the amenity of occupiers/users of nearby property and land, for example through overlooking or noise, whilst having regard to the sensitivities of surrounding development […]"

2.2 HDC are in the process of developing their new Local Plan[9], including new planning policies related to Air Quality, which states:

Strategic Policy 12: Air Quality:

"The Council recognises the direct effects air quality has on public health, natural habitats and biodiversity, including its contribution to climate change, and the importance of the management of air quality. Taking into account any relevant Planning Guidance Documents and / or policies within this Plan, proposals will be required to:

1. *Adhere to the Air Quality and Emissions Mitigation Guidance for Sussex (2021), or any future updates, to identify if an Air Quality Impact Assessment and / or an Emissions Mitigation Statement is required;*
2. *Contribute to the implementation of local Air Quality Action Plans, and not conflict with the set objectives;*
3. *Minimise traffic generation and congestion through access to sustainable transport modes, maximising the provision for cycling and pedestrian facilities;*
4. *Encourage the use of cleaner transport fuels, including through the provision of electric car charging points.*
5. *Take into account habitats or biodiversity designations that are sensitive to air quality changes, including ancient woodland. Habitats identified as sensitive to such changes, including proposals within 7km of The Mens, will require a relevant impact assessment and appropriate mitigation measures to be put in place.*
6. *Mitigate the impact on the amenities of users of the site and surrounding land to an appropriate level, during both construction and operation where development creates or results in pollution including particulates, dust, smoke,*

9 Horsham District Council. (2024). *Horsham District Local Plan 2023-2040*. Available at: https://strategicplanning.horsham.gov.uk/gf2.ti/-/1583938/192184357.1/PDF/-/Horsham%20District%20Local%20Plan%20Regulation%2019.pdf

pollutant gases or odour, as outlined in the Air Quality and Emissions Mitigation Guidance for Sussex (2021), or any future updates; and

7. *Ensure that the cumulative impact of all relevant permitted and allocated developments, including associated traffic impacts, is appropriately assessed."*

Strategic Policy 11: Environmental Protection:

"The high quality of the District's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning and Technical Guidance Documents, developments will be expected to minimise exposure to, and the emission of, pollutants including noise, odour, vibration, air and light pollution arising from all stages of development. Development proposals must ensure that they: [...]

6. *Minimise air pollution and greenhouse gas emissions in order to protect human health and the natural environment.*

7. *Contribute to the implementation of local Air Quality Action Plans and do not conflict with their objectives.*

8. *Maintain or reduce human exposure to odour and poor air quality, with specific consideration given to development that will result in new public exposure, particularly vulnerable people (e.g. the elderly, care homes or schools); and*

9. *Ensure that the cumulative impact of all relevant permitted and allocated developments, is appropriately assessed.*

Proposals for new development within the vicinity of an existing business or community facility will not be supported where it is considered that the current use could have a significant adverse environment impact on the new development, unless it can be demonstrated that suitable mitigation will be implemented prior to the occupation or use of the new proposal."

3. Assessment Methodology

Guidance

3.1 Defra's *Local Air Quality Management Technical Guidance* (LAQM.TG(22))[10] was followed in carrying out the assessment, in addition to the latest EPUK & IAQM guidance on *Planning for Air Quality*[11] which was also referred to throughout the assessment.

3.2 Guidance published by the IAQM on the *Assessment of Dust from Demolition and Construction*[12] was also used to assess the risk of dust emissions during the construction phase of the proposed development.

3.3 The Greater London Authority (GLA) *Supplementary Planning Guidance*[13] on the control of dust from construction has also been referred to, which is considered best practice guidance for the UK. It details a number of mitigation measures that should be adopted to minimise adverse impacts from dust and fine particles.

3.4 HDC is a member of the Sussex Air partnership, and therefore an emissions mitigation assessment (EMA) has been carried out following Sussex-Air's *Air Quality and Emissions Mitigation Guidance (2021)*[14].

Baseline Conditions

3.5 Baseline air quality conditions in the vicinity of the site are established through the compilation and review of appropriately sourced background concentration estimates and local monitoring data.

3.6 Defra provides estimated background concentrations of the UKAQS pollutants at the UK Air Information Resource (UK-AIR) website[15]. These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km^2 National Grid square locations across the UK. At the time of writing, the most recent background maps were from August 2020 and based on monitoring data from 2018.

10 Defra. (2022). *Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management, Technical Guidance LAQM.TG(22).*
11 Environmental Protection UK & Institute of Air Quality Management. (2017). *Land-Use Planning & Development Control: Planning for Air Quality.*
12 Institute of Air Quality Management. (2024). *Guidance on the assessment of dust from demolition and construction*.
13 Greater London Authority. (2014). *The Control of Dust and Emissions During Construction and Demolition*.
14 Sussex Air Quality Partnership. (2021). *Air Quality and Emissions Mitigation Guidance for Sussex*.
15 Defra: UK-AIR. www.uk-air.defra.gov.uk

3.7 Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emissions sources within the general area of a particular grid square location. Concentrations of pollutants at various sensitive receptor locations can, therefore, be calculated by modelling the emissions from a nearby pollution source, such as a busy road, and then adding this to the appropriate UK-AIR background datum.

3.8 HDC's automatic and non-automatic local pollutant monitoring data are also considered an appropriate source for establishing baseline air quality at the application site. The most recent available data from HDC's *2024 Air Quality Annual Status Report*[16] (ASR) have been included and referenced.

Construction Phase

3.9 The construction phase of the proposed development will involve a number of activities that could potentially produce polluting emissions to air. Predominantly, these will be emissions of dust. However, they could also include releases of odours and/or more harmful gases and particles.

3.10 The IAQM's guidance to assess the impacts of construction emissions on human and ecological receptors has been followed in carrying out this air quality assessment. The guidance suggests that where a receptor is located within 250m (50m for statutory ecological receptors) of a site boundary and/or 50m of a route used by construction vehicles, up to 250m from the site entrance, a dust assessment should be undertaken. High sensitivity receptors are considered particularly sensitive when located within 20m of a works area. Figure 2 shows receptors that could be sensitive to dust that are located within 250m of the site boundary.

3.11 The Multi Agency Geographic Information for the Countryside (MAGIC) website[17], which incorporates Natural England's interactive maps, has been reviewed to identify whether any statutory ecological sensitive receptors are situated within 50m of the site boundary or within 50m of any routes used by construction vehicles on the public highway, up to 250m from the site entrance.

Construction Significance

3.12 The IAQM guidance suggests that Demolition, Earthworks, Construction and Trackout should all be assessed individually to determine the overall significance of the construction phase.

16 Horsham District Council. (2024). *2024 Horsham District Council Air Quality Annual Status Report.*
17 Natural England and MAGIC partnership organisations. Multi Agency Geographic Information for the Countryside. http://www.magic.gov.uk/ [Accessed September 2024].

3.13 In the IAQM dust guidance, the first step in assessing the risk of impacts is to define the potential dust emission magnitude. This can be considered 'Negligible', 'Small', 'Medium' or 'Large' for each of the construction stages. Whilst the IAQM provides examples of criteria that may be used to assess these magnitudes, the vast number of potential variables mean that every site is different and therefore professional judgement must be applied by what the IAQM refer to as a "technically competent assessor". The construction phase assessment therefore relies on the experience of the appraiser.

3.14 As such, attempts to define precisely what constitutes a negligible, small, medium or large dust emission magnitude should be treated with caution. Factors such as the scale of the work, both in terms of size and time, the construction materials and the plant to be used must be considered.

3.15 The second step is to define the sensitivity of the area around the construction site. As stated in the IAQM guidance:

"the sensitivity of the area takes into account a number of factors:

- *the specific sensitivities of receptors in the area;*
- *the proximity and number of those receptors;*
- *in the case of PM_{10}, the local background concentrations; and*
- *site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust."*

3.16 Based on these factors, the area is categorised as being of 'Low', 'Medium' or 'High' sensitivity.

3.17 When dust emission magnitudes for each stage and the sensitivity of the area have been defined, the risk of dust impacts can be determined. The IAQM provides a risk of impacts matrix for each construction stage. The overall significance for the construction phase can then be judged from the stages assessed. Again, this is subject to professional judgement.

3.18 Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the site will also be released. However, the volumes and periods over which these releases will occur are unlikely to result in long-term impacts on local air quality and therefore this has been scoped out of the assessment.

Operational Phase

Road Transport Sources

3.19 Vehicle emissions will arise from the combustion of fossil fuels in vehicle engines and their subsequent release to atmosphere via tailpipe exhausts. The most significant pollutants released by cars and other vehicles are oxides of nitrogen (NO_2/NO_x) and particulate matter (PM_{10} and $PM_{2.5}$). Releases of carbon monoxide (CO) and some volatile hydrocarbons (e.g. benzene and 1,3-butadiene) are of less significance and are not assessed further in this report.

3.20 As it is elevated annual mean concentrations of NO_2 and PM_{10} that have resulted in the declaration of most AQMAs across the UK, these are the pollutants of most concern, and they have therefore been the focus of this air quality assessment. $PM_{2.5}$, which is another fraction of particulate matter, has also been considered.

3.21 The latest EPUK & IAQM planning guidance[11] provides indicative thresholds for changes in traffic flows which would require a detailed, dispersion modelling assessment of potential air quality impacts. These are a change in 24-hour annual average daily traffic (AADT) flows exceeding 100 light-duty vehicles (LDVs) and/or 25 heavy-duty vehicles (HDVs) on any specific road link within, or adajcent to, an AQMA or a change of AADT flows exceeding 500 LDVs and/or 100 HDVs elsewhere. Changes in traffic flows below these screening thresholds are unlikely to result in significant air quality effects.

3.22 Full justification behind the screening of air quality related impacts on existing receptor location in the local area has been provided in Chapter 6 of this report.

Emission Mitigation Assessment

3.23 The purpose of an emissions mitigation assessment is to determine an appropriate level of mitigation required from a development. They are an alternative way to assess the impact of a development on air quality and they help ensure that all developments, even those which have no significant impact on air quality, include appropriate mitigation to minimise their impact.

3.24 The assessment was undertaken in line with guidance provided by the Sussex-Air Partnership[14]. As the proposed development would be classified as *Major* under this guidance, an emissions cost calculation was required.

Emissions Cost Calculation

3.25 The emissions calculation utilised the latest Defra Emission Factor Toolkit (EFT v12.1)[18] to determine total transport related emissions (NO_X & $PM_{2.5}$) that would be generated by the proposed development.

18 Defra. (2024). *Emission Factor Toolkit (version 12.1).*

3.26 Defra provides 'damage costs'[19], which are a set of impact values, defined per tonne of pollutant for use in this calculation. Damage costs estimate the societal costs associated with changes in pollutant emissions, which are then combined with the forecasted emissions changes to provide an approximation valuation of the cost (or benefit) to society caused by development.

3.27 Defra's Appraisal Toolkit[20], which incorporates the latest damage cost values, was used in the calculation. The principal of the calculation is summarised in the equation below:

EFT output x Damage costs x 5 years = 5 year exposure cost value (in £)

3.28 As a number of the inputs are based on assumptions, the resulting figure should be treated with caution, but it can be used to give an idea of the scale of a development in terms of total generated transport emissions and therefore a gauge of what level of mitigation might be appropriate.

3.29 It is usual for costs established in this way to be apportioned to low emission measures associated with a proposed development. In doing this it should be possible for the 'emissions cost' to be offset.

19 Defra. (2023). *Damage Cost*. Available at: https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance
20 Defra. (2023). *Air Quality Damage Cost Appraisal Toolkit.*

4. Baseline Assessment

4.1 This chapter is intended to establish prevailing air quality conditions in the vicinity of the development site.

UK-AIR Background Pollution

4.2 UK-AIR[15] predicted background concentrations of NO_2, PM_{10} and $PM_{2.5}$ for 2019 to 2030 are presented in Table 4.1. These data were taken from the central grid square location closest to the application site (grid reference: 518500, 118500).

Table 4.1: 2019 to 2030 Background Concentrations of Pollutants at the Site

Pollutant	Predicted background concentration (µg.m^{-3})										Averaging Period	Air Quality Standard Concentration (µg.m^{-3})
	2019	2020	2021	2022	2023	2024	2025	2026	2028	2030		
NO_2	8.0	7.7	7.5	7.2	7.0	6.7	6.5	6.4	6.2	6.0	annual mean	40
PM_{10}	14.0	13.8	13.6	13.5	13.3	13.1	13.0	13.0	13.0	13.0	annual mean	40
$PM_{2.5}$	8.9	8.7	8.6	8.5	8.3	8.2	8.0	8.1	8.1	8.1	annual mean	20

4.3 The data in Table 4.1 show that annual mean background concentrations of NO_2, PM_{10} and $PM_{2.5}$, in the vicinity of the application site, between 2019 and 2030, are predicted to be well below their respective AQSs.

4.4 The data show that for 2024, annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ are predicted to be below their respective AQSs by 83.3%, 67.3% and 59.0% respectively. As such, annual mean background pollutant concentrations are likely to be well below their respective AQSs at, and within the vicinity of, the site.

4.5 Concentrations of all pollutants are predicted to decline each year until 2026, when PM_{10} and $PM_{2.5}$ concentrations are expected to stabilise. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles, but also due to UK national and international plans to reduce emissions across all sectors.

Local Sources of Monitoring Data

4.6 Air quality monitoring is considered an appropriate source of data for the purposes of describing baseline air quality. At the time of writing, the most recent ASR[16], released by HDC, included local pollutant monitoring data from 2023.

Automatic Monitoring

4.7 HDC undertook automatic (continuous) monitoring at three locations within their authoritative boundary between 2019 and 2023. Of these locations, all three monitored NO_2, two monitored PM_{10}, and one monitored $PM_{2.5}$. The most recent available NO_2 monitoring data from local automatic monitoring stations are included in Table 4.2, below.

Table 4.2: HDC's Automatic NO_2 Monitoring Data

Monitor	Type	Distance from the Site (km)	Annual mean NO_2 concentration ($\mu g.m^{-3}$)				
			2019	2020	2021	2022	2023
HO5	R	4.4	23.6	23.4	20.3	21.0	24.6
HO4 (AURN)	R	10.5	22.0	17.4	20.1	17.6	17.4
HO2	R	11.8	24.4	18.8	21.1	17.7	16.2

Note: "R" = Roadside.

4.8 The data in Table 4.2 show that the annual mean NO_2 concentration recorded at all three automatic monitoring stations were consistently below the respective 40 $\mu g.m^{-3}$ AQS for NO_2 between 2019 and 2023.

4.9 The closest automatic monitoring station to the site, HO5, is located in a roadside setting, adjacent to the A272 Bolney Road approximately 4.4km to the north-east of the site. This monitor recorded an annual mean NO_2 concentration of 24.6 $\mu g.m^{-3}$ in 2023, which is below the 40 $\mu g.m^{-3}$ AQS by 38.5%. Given the location of HO5, adjacent to a junction within the Horsham Cowfold AQMA, recorded pollutant concentrations are likely to be elevated compared to baseline concentrations expected across the development site. Monitor HO5 recorded the highest annual mean NO_2 concentration in 2023 of each of HDC's automatic monitors.

4.10 The most recent available PM_{10} monitoring data is included in Table 4.3 below.

Table 4.3: HDC's Automatic PM_{10} Monitoring Data

Monitor	Type	Distance from the Site (km)	PM_{10} annual mean concentration ($\mu g.m^{-3}$)				
			2019	2020	2021	2022	2023
HO4 (AURN)	R	10.5	-	-	-	14.0	13.7
HO2	R	11.8	19.3	15.7	17.5	19.3	20.5

Note: "R" = Roadside.

4.11 The data in Table 4.3 show that automatic monitors HO4 and HO2 recorded PM_{10} concentrations well below the 40 $\mu g.m^{-3}$ annual mean AQS between 2019 and 2023.

4.12 In 2023, an annual mean concentration of 13.7 µg.m^{-3} was recorded at HO4; 65.8% below the long-term AQS. H04 is the closest automatic monitor to the application site that recorded PM_{10} concentrations, located in a roadside setting, adjacent to the A283 Manley's Hill approximately 10.5km from the application site.

4.13 Automatic monitor HO2 recorded an annual mean PM_{10} concentration of 20.5 µg.m^{-3} in 2023 (48.8% below the respective AQS); the highest recorded concentration of PM_{10} of the two automatic monitors. Monitor HO2 is located 11.8km north of the site, in a roadside setting, adjacent to the A281 Park Way and B2195 Park Street junction.

4.14 Automatic monitoring of $PM_{2.5}$ was conducted at one site (HO4) between 2019 and 2023. $PM_{2.5}$ concentrations for HO2 Horsham Park Way were estimated from the collated PM_{10} data by HDC. These data are included in Table 4.4 below.

Table 4.4: HDC's Automatic $PM_{2.5}$ Monitoring Data

Monitor	Type	Distance from the Site (km)	$PM_{2.5}$ annual mean concentration (µg.m^{-3})				
			2019	2020	2021	2022	2023
HO4 (AURN)	R	10.5	-	-	-	7.3	7.7
HO2	R	11.8	13.5	11.0	12.3	13.1	14.6

Note: "R" = Roadside. $PM_{2.5}$ values for HO2 were estimated from the PM_{10} data using a nationally derived correction multiplying ratio of 0.7 for 2019 to 2021, 6.4 for 2022, and 5.9 for 2023.

4.15 The data in Table 4.4 show that automatic monitors HO4 and HO2 recorded $PM_{2.5}$ concentrations well below the respective 20 µg.m^{-3} annual mean AQS between 2019 and 2023.

4.16 The closest automatic monitor, HO4, recorded an annual mean $PM_{2.5}$ concentration of 7.7 µg.m^{-3} in 2023; 61.5% below the annual mean AQS.

4.17 The highest annual mean $PM_{2.5}$ concentration of 14.6 µg.m^{-3} was estimated for monitor HO2 in 2023; 27.0% below the 20 µg.m^{-3} AQS.

Non-Automatic Monitoring

4.18 HDC operate an extensive non-automatic NO_2 diffusion tube monitoring network, comprising 48 measurement sites deployed in strategic locations across the district. To analyse data considered most representative of likely conditions at the site, monitoring stations located within 5km of the application site have been reviewed, with the most recent available monitoring data for these diffusion tubes included in Table 4.5.

Table 4.5: HDC's Non-Automatic NO_2 Diffusion Tube Monitoring Data

Monitor	Type	Distance from the site (km)	NO_2 annual mean concentration ($\mu g.m^{-3}$)				
			2019	2020	2021	2022	2023
2	R	3.6	22.2	19.9	20.9	18.2	18.2
36	R	4.1	23.5	21.7	20.5	20.3	19.6
37	R	4.4	36.1	30.2	31.2	31.7	28.3
44, 45, 46	R	4.4	23.6	19.2	19.9	20.0	17.5
12, 20	R	4.5	31.6	26.8	26.5	26.4	24.1
14	R	4.5	-	-	-	-	18.2
21	R	4.5	30.7	24.6	26.5	25.5	24.1
22	R	4.5	26.8	22.5	22.2	20.3	19.5
43	UB	4.5	11.6	10.9	10.5	10.3	8.9

Note: "R" = Roadside. "UB" = Urban Background.

4.19 The data in Table 4.5 show that annual mean concentrations of NO_2 at locations within 5km of the application site were below the 40 $\mu g.m^{-3}$ AQS for NO_2 between 2019 and 2023.

4.20 The closest diffusion tube, 2, is located in a roadside setting approximately 3.6km south-east of the application site, adjacent to the A281 High Street, Henfield. This monitor recorded an average NO_2 concentration of 18.2 $\mu g.m^{-3}$ in 2023, which is 54.5% below the annual mean AQS.

4.21 The highest annual mean NO_2 concentration recorded at a diffusion tube within 5km of the application site, in 2023, was 28.3 $\mu g.m^{-3}$ at diffusion tube 37; 29.3% below the annual mean AQS. This monitor is located 4.4km south of the application site, adjacent to the A272 Bolney Road, within the Horsham Cowfold AQMA.

5. Construction Phase Impacts

5.1 The construction phase of the proposed development will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust.

5.2 The estimates for the dust emission magnitude for demolition, earthworks, construction and trackout below are based on the professional experience of Phlorum's consultants, information provided by the client and Google Earth imagery.

Dust Emission Magnitude

Demolition

It is understood that there will not be any demolition works at the site.

Earthworks

5.3 Where the total area of the site is between 18,000m^2 and 110,000m^2, the dust emission magnitude category for earthworks can be defined as *Medium*, according to the IAQM guidance[12]. The total site area is approximately 63,300m^2, therefore falling into the IAQM's *Medium* dust emission category for earthworks.

5.4 During the earthworks phase it is expected that fewer than 5 heavy-earth moving vehicles will operate at any one time, falling into the IAQM's *Small* category.

5.5 It is understood that there is no land contamination, and no bunds will be formed on site.

5.6 Based on the total area of the site and based on professional judgement, the overall dust emission magnitude of the earthworks stage is considered to be *Medium* with reference to the IAQM guidance[12].

Construction

5.7 During construction, activities that have the potential to cause emissions of dust may include piling, sandblasting and concrete batching. Localised use of cement powder and general handling of construction materials (such as aggregate for road construction) also have the potential to generate dust emissions, as does the effect of wind-blow from stockpiles of friable materials. It is anticipated that some cement powder will be used on site, however the full details of construction processes are not yet known.

5.8 It is estimated that the total building volume of the proposed residential development is between 12,000m^3 and 75,000m^3, falling into the IAQM's *Medium* dust emission magnitude category for construction[12].

5.9 Therefore, based on the above, the overall dust emission magnitude for the construction phase is considered to be *Medium*[12].

Trackout

5.10 Construction traffic, when travelling over soiled road surfaces, has the potential to generate dust emissions and to also add soil to the local road network. During dry weather, soiled roads can lead to dust being emitted due to physical and turbulent effects of vehicles.

5.11 The site entrance of the application site will utilise Bines Road, to the east of the site. It is not yet clear as to whether unpaved road surfaces will be used on-site during construction.

5.12 As the information regarding the trackout phase is limited, the overall dust emission magnitude for the trackout phase is conservatively considered to be *Medium* with reference to the IAQM guidance.

Emission Magnitude Summary

5.13 A summary of the dust emission magnitude as a result of the activities of Earthworks, Construction, and Trackout as specified in the IAQM guidance, and discussed above, are listed in Table 5.1 below.

Table 5.1: Dust Emission Magnitude for the construction activities, based on the IAQM's guidance

Activity	Dust Emission Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Medium

Sensitivity of the Area

5.14 Having established the emission magnitudes for each phase, the sensitivity of the area must be considered to establish the significance of effects. The effect of dust emissions depends on the sensitivity of each receptor.

5.15 High sensitivity human receptors include residential dwellings, schools and hospitals, but can include locations such as car showrooms when considering the impacts of dust soiling.

5.16 The impacts of dust emissions from the sources discussed above have the potential to cause an annoyance to human receptors living in the local area. Within distances of 20m of the site boundary there is a high risk of dust impacts, regardless of the prevailing wind direction. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the dust source.

5.17 With the exponential decline in dust levels with distance from dust generating activities, it is considered that for receptors more than 250m from the site boundary, the risk is negligible. Furthermore, the risks at over 100m only have the potential to be significant in certain weather conditions, e.g. downwind of the source during dry periods.

5.18 The approximate number of high sensitivity human receptors in the vicinity of the site is detailed in Table 5.2 below and shown in Figure 2.

Table 5.2: Approximate number of High Sensitivity Receptors close to the site

Distance to site (m)	Approximate number of receptors	Receptor Details
<20	6	Adjacent residential dwellings on Bines Road
<50	22	Surrounding residential dwellings on Bines Road
<100	40	Surrounding residential dwellings, namely those on Bines Road and Lock Lane
<250	84	Surrounding residential dwellings in Partridge Green

5.19 Figure 3 shows that the predominant wind direction at Charlwood (2023), the closest relevant meteorological station, is from the south-west, with occasional winds from the north-east. As shown in Table 5.2 (above), there are 6 high sensitivity residential receptors within 20m of the application site. As such, the sensitivity of the area to dust soiling impacts is defined as *Medium*, with reference to the IAQM guidance[12].

5.20 Local monitoring data and UK-AIR predicted annual mean concentrations of PM_{10} are below 24 $\mu g.m^{-3}$ at the site[21]. This provides a good indication that PM_{10} concentrations for both annual mean and daily mean are likely to be below the respective AQSs at the site and adjacent uses. Therefore, the sensitivity of the area to human health impacts is defined as *Low*, according to the IAQM guidance[12].

21 The 24.0$\mu g.m^{-3}$ 'threshold' is taken from Table 3 of the IAQM's construction dust guidance. This threshold, along with the number of receptors, their sensitivity, and their distance from source (construction site), helps establish the sensitivity of an area in terms of potential human health impacts from exposure to PM_{10}. According to the guidance, baseline annual mean PM_{10} concentrations below 24.0$\mu g.m^{-3}$ indicate that the sensitivity of the area in terms of human health impacts is *Low* in all cases except when there are a large number (>100) of highly sensitive receptors within 20m of the construction site.

5.21 Review of the MAGIC website[17], which incorporates Natural England's interactive maps, has identified no statutory ecological receptors within 50m of the site, or 50m of roads to be used by construction traffic, up to 250m from the site entrance. The closest statutory ecological site is the South Downs National Park, located approximately 5.4km to the north of the application site. Therefore, based on distance alone, the construction of the proposed development can be considered to have a *Negligible* impact on local ecological sites.

Risk of Impacts

5.22 Having established the potential dust emission magnitudes and sensitivity of the area, the risk of impacts can be determined in accordance with the IAQM guidance. These are summarised in Table 5.3.

Table 5.3: Summary of Impact Risk by Construction Stage based on the IAQM's dust guidance.

Stage	Impact Risk		
	Nuisance Dust	Ecology	PM_{10} Effects on Health
Earthworks	*Medium Risk*	*Negligible Risk*	*Low Risk*
Construction	*Medium Risk*	*Negligible Risk*	*Low Risk*
Trackout	*Medium Risk*	*Negligible Risk*	*Low Risk*

5.23 Overall, and using professional judgement, the proposed development is considered to be *Medium Risk* for nuisance dust soiling effects, *Low Risk* for PM_{10} health effects and *Negligible Risk* for ecological impacts, in the absence of mitigation.

Site Specific Mitigation

5.24 The GLA guidance[13] suggests a number of mitigation measures that should be adopted in order to minimise impacts from dusts and fine particles. Appropriate measures that could be included during construction of the proposed development include:

- ideally cutting, grinding and sawing should not be conducted on-site and pre-fabricated material and modules should be brought in where possible;
- where such work must take place, water suppression should be used to reduce the amount of dust generated;
- skips, chutes and conveyors should be completely covered and, if necessary, enclosed to ensure that dust does not escape;
- no burning of any materials should be permitted on site;

- any excess material should be reused or recycled on-site in accordance with appropriate legislation;
- developers should produce a waste or recycling plan;
- following earthworks, exposed areas and soil stockpiles should be re-vegetated to stabilise surfaces, or otherwise covered with hessian or mulches;
- stockpiles should be stored in enclosed or bunded containers or silos and kept damp where necessary;
- hard surfaces should be used for haul routes where possible;
- haul routes should be swept/washed regularly;
- vehicle wheels should be washed on leaving the site;
- all vehicles carrying dusty materials should be securely covered; and
- delivery areas, stockpiles and particularly dusty items of construction plant should be kept as far away from neighbouring properties as possible.

5.25 In addition, the IAQM[12] lists recommended mitigation measures for low, medium and high dust impact risk sites. The highly recommended mitigation measures for *Medium Risk* sites are included in Appendix A of this report.

5.26 Where dust generation cannot be avoided in areas close to neighbouring properties, additional mitigation measures should be put in place, such as: windbreaks, sprinklers, and/or time/weather condition limits on the operation of some items of plant or the carrying out of activities that are likely to generate a particularly significant amount of dust.

Residual Effects

5.27 After the implementation of the mitigation measures listed above and in Appendix A, the significance of each phase of the construction programme will be reduced and the residual significance of impact for the construction phase is expected to be *Negligible*.

6. Operational Phase Impact

Impacts on Local Air Quality

6.1 The latest EPUK & IAQM planning guidance[11] provides indicative thresholds for changes in traffic flows which would require a detailed air quality assessment when within, or outside of, an AQMA. These are a change in 24-hour AADT flows of more than 100 LDVs and/or 25 HDVs when within, or adjacent to, an AQMA and/or changes in AADT flows of more than 500 LDVs and/or 100 HDVs elsewhere. Changes below these thresholds can be reasonably considered to have an insignificant impact on local air quality.

6.2 Information provided by Paul Basham Associates, the transport consultants for the project, indicate that the proposed development is predicted to generate a total AADT of 457 (including 1% HDVs). This is below the AADT generation thresholds prescribed within the EPUK & IAQM guidance for roads outside of an AQMA, and therefore, it can reasonably be assumed that, given the development site is not situated within an AQMA, the proposed development would not significantly impact local air quality.

6.3 It is anticipated that the A281 will experience a daily increase of 153 LDV flows as a result of the operation of the proposed development. As these flows are likely to enter the Cowfold AQMA, located 4.3km to the north-east of the application site, the thresholds outlined within the EPUK & IAQM guidance[11] for roads within an AQMA are likely to be exceeded at this specific location only.

6.4 However, as stipulated within HDC's latest ASR[16], it is expected that the Cowfold AQMA will soon be revoked, as no exceedances of the annual mean AQS for NO_2 has been recorded at any of the diffusion tubes located within the management area in recent years. Additionally, annual mean NO_2 concentrations within the Cowfold AQMA were significantly below the respective AQS in 2023, with the highest recorded annual mean concentration being 28.3 $\mu g.m^{-3}$; 29.3% below the annual mean AQS. Therefore, the need to undertake a detailed dispersion modelling assessment of the proposed development's impact on local air quality at existing sensitive receptor locations in the AQMA has been screened out.

Site Suitability

6.5 LAQM.TG (22)[10] (Tables 7-7 and 7-8) sets out the classification of monitoring locations and where these are in relation to sources of pollution. The guidance states that an *urban background* location is, as follows:

"An urban location distanced from sources and therefore broadly representative of city-wide background conditions, e.g. urban residential areas."

6.6 The AEA Diffusion Tube for Ambient NO_2 Monitoring: Practical Guide[22] (AEA guidance) provides further detailed definitions which help to classify urban background sites. Specifically, Section 3.2.2 states that, where a site meets the following criteria, it can be reasonably defined as being set in an urban background location, away from adverse impacts associated with emissions from road sources:

- >50m from any major source of NO_2 (e.g., multi-storey car parks)
- >30m from any very busy road (>30,000 vehicles per day);
- >20m from any busy road (10,000 – 30,000 vehicles per day);
- >10m from any main road; and
- >5m from locations where vehicles may stop with their engines idling.

6.7 The primary sources of air pollution within the vicinity of the site are vehicles travelling on the nearby local road network, particularly the B2135 Bines Road bounding the application site to the east. The transport consultants for this project, Paul Basham Associates, presented count data for the B2135 Bines Road that estimates a 2-way AADT flow of 3,566. Using this count data, the B2135 Bines Road can be classified as a main road, with reference to the AEA guidance[22].

6.8 As sensitive uses proposed at the development site are distanced approximately 15m from the B2135 Bines Road (a main road) and 12m from Lock Lane, all proposed sensitive uses can be considered to be set in an *Urban Background* location with reference to the AEA guidance[22]. Following LAQM.TG(22) guidance[10], it is expected that pollutant concentrations across these areas are likely to be similar to those identified at *Urban Background* sites within the local area, which are well below the relevant AQSs.

6.9 There is one *Urban Background* monitoring site within 5km of the site boundary, diffusion tube 43, that has consistently recorded an annual mean NO_2 concentration below the respective AQS, from 2019 to 2023. It can be considered likely that NO_2 concentrations at the site would be similar to concentrations measured at tube 43, thereby indicating that annual mean concentrations of NO_2 are below the respective AQS, at the site.

6.10 UK-AIR background concentrations indicate that NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site are likely to be well below their relevant AQSs, and are expected to decrease further in future years.

6.11 Therefore, the site is anticipated to be suitable, in air quality terms, for its proposed end use, and no further assessment of site suitability is required.

22 AEA Energy and Environment. (2008). *Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users.*

7. Emissions Mitigation Assessment

Emission cost calculation

7.1 Following the March 2023 update to Defra's emissions cost calculation guidance, the emissions cost calculation below has been carried out to estimate the value of the impact of NO_x and $PM_{2.5}$ emitted as a result of the proposed development.

7.2 To evaluate the scale of a proposed development's total emissions, Defra recommends an emissions cost calculation using the following formula:

Road Transport Emission Increase (Cost, £) =

Estimated trip rate for 5 years × Emission Rate/10km/vehicle type × Damage Costs

7.3 The latest Defra Emissions Factor Toolkit[18] was used to determine the total transport related emissions that would be generated by the proposed development; the inputs used in the calculation are shown in Table 7.1.

Table 7.1: Calculation Inputs

Input	Value	Unit	Source/Guidance
Trip Length	10	km	Sussex Air Guidance
Net Traffic Flow	457 AADT (1% HDV)	AADT	Transport Consultant
EFT Road Type	Urban (not London)	-	EFT
EFT Year	2025 – 2029	-	Opening year + 4 years (In line with EFT estimates)
Average Speed	50	$km.hr^{-1}$	Sussex Air Guidance
Appraisal period	5	years	Sussex Air Guidance

7.4 The total emission 'damage' cost was calculated using Defra's appraisal toolkit and is presented in Tables 7.2 and 7.3.

7.5 The calculation accounts for an 'uplift factor' of 2% cumulatively per annum and a 'discount rate', in line with the latest 2023 guidance[19]. Central estimate damage costs for '*Road Transport Urban Medium*' were based on Defra 2024 prices.

7.6 The opening year of the development has not been provided as there is uncertainty surrounding the duration of the planning and construction phases. For conservatism, the earliest opening year, 2025, has been used to calculate the 'emissions cost' as this decreases annually. By calculating for 2025 to 2029 (the first five years), the calculated 'emissions cost' within this report serves as a maximum cost and can be applied regardless of the true opening year.

Mitigation

7.8 The resulting value of the 'emissions cost', as calculated above, is indicative of the value of an appropriate package of mitigation to offset any potential impacts from the proposed development. The mitigation package should at least equate to this 'emissions cost'.

7.9 As the development is considered to be 'Major' in accordance with The Town and Country Planning guidance[23], the Sussex-Air guidance[14] details the following mitigation measures should be included as a minimum:

- all gas-fired boilers are expected to meet a minimum standard of <40mgNO_x/kWh, with consideration given to renewable energy sources.

23 The Town and Country Planning (Development Management Procedure) (England) Order 2015. (2024). Available at: https://www.legislation.gov.uk/uksi/2015/595/article/2/2024-02-12.

- meet electric vehicle charging point (EVCP) guidance set out in West Sussex County Council's (WSCC) *Guidance on Parking at New Developments*[24].

7.10 The proposed development will encompass the following mitigation measures:

- Provision of secure cycle storage;
- Improvements to cycle paths and the local cycle network;
- A Travel Plan that motivates low emissions technologies;
- A welcome pack for new occupants to encourage the use of sustainable transport modes;
- "Cable to Property" broadband to facilitate working from home;
- Provision of green infrastructure; and
- Provision of EVCP.

7.11 Consideration will be given to low-emission heat/energy sources, but the energy strategy is not finalised at the time of writing.

7.12 Further mitigation measures are still under consideration and will likely result in the implementation of additional mitigation measures that are not listed above.

7.13 EVCP provision must be compliant with the relevant WSCC guidance[24] and the updated Part S of The Building Regulations 2010[25].

7.14 It is anticipated that the proposed mitigation measures will offset the calculated 'emissions cost'. Should the scheme's proposed mitigation package not at least equate to the 'emissions cost', the developer should implement further mitigation measures to ensure that this cost is fully offset, and the scheme fully offsets any incremental impacts associated with its operation.

24 West Sussex County Council. (2020). *Guidance on Parking at New Developments.*
25 The Building Regulations 2010. (2023). Available at: The Building Regulations 2010 (legislation.gov.uk)

8. Discussion

Construction Phase Impacts

8.1 The construction phase of the proposed development could potentially give rise to emissions which could cause dust soiling effects on adjacent uses. Following IAQM guidance, the construction phase of the proposed development can be considered as *Medium Risk* for nuisance dust soiling effects, *Low Risk* for and PM_{10} health effects and *Negligible* for ecological impacts.

8.2 Following the implementation of the mitigation measures provided in Appendix A and listed in Section 5.24, emissions from the construction programme will be reduced and the residual significance of impact for the construction phase is expected to be *Negligible*, thus complying with the requirements of the NPPF[6].

Operational Phase Impacts

8.3 The need to undertake a detailed pollutant dispersion modelling assessment of the proposed development's sensitivity to local air quality has been screened out using Defra and AEA guidance along with local pollutant monitoring data. This was primarily due to proposed sensitive uses at the site being well distanced from local pollution sources and background concentrations being anticipated to be well below relevant AQSs. Therefore, the site is considered to be suitable for the introduction of new, sensitive receptors, and no further assessment of site suitability is considered necessary.

8.4 Traffic generated by the proposed development is not expected to exceed relevant traffic change thresholds, prescribed by the EPUK & IAQM guidance, that would require detailed modelling of traffic emissions, except within the Cowfold AQMA, 4.3km north-east of the application site. As discussed above, it is understood that HDC are planning to revoke the Cowfold AQMA as monitoring data over recent years indicate a decreasing trend in annual mean NO_2 concentrations, whilst remaining comfortably below the respective long-term AQS[16]. Therefore, it can be reasonably assumed that the operation of the proposed development would have an insignificant impact on local air quality.

Emissions Mitigation Assessment

8.5 The Sussex-Air emissions mitigation guidance requires an Emissions Mitigation Assessment for all 'Major' developments, to help minimise the potential for incremental impacts on local air quality.

8.6 Following the latest Defra Damage Cost guidance and guidance from Sussex-Air (2021), an 'emissions cost' of [redacted] was calculated as a result of emissions of NO_x and $PM_{2.5}$ expected to be generated by traffic associated with the scheme.

8.7 Current plans to offset potential air quality impacts include the provision of secure cycle storage, improvements to the local cycle networks, a Travel Plan, a welcome pack to encourage sustainable transport, "cable to property" broadband to promote working from home, green infrastructure, and EVCP. Additional mitigation measures are still under consideration for the development. It is anticipated that the proposed mitigation measures will offset the calculated 'emissions cost', however the developer should implement further mitigation measures to if this cost is not fully offset.

9. Conclusions

9.1 Phlorum Limited was commissioned by Strutt and Parker, on behalf of Croudace Homes Limited, to undertake an Air Quality Assessment for a proposed residential development, encompassing 101 dwellings, to the west of Bines Road, Partridge Green, Horsham.

9.2 UK Air Information Resource predicted background concentrations and local air quality monitoring from the wider area suggest that air pollution concentrations within the vicinity of the application site are likely to be below the relevant UK Air Quality Strategy standard concentrations.

9.3 The construction phase of the proposed development could give rise to emissions which could cause dust soiling effects on adjacent uses. However, by adopting appropriate mitigation measures to reduce emissions and their potential impact, there should be no significant residual effects, thus complying with the requirements of the National Planning Policy Framework.

9.4 The operation of the proposed development is not expected to introduce new, sensitive receptors into an area of existing poor air quality, nor is it anticipated to significantly impact on local air quality.

9.5 To mitigate for future emissions and offset the 'emissions cost' calculated following guidance from Defra and the Sussex-Air partnership, the proposed development will include use of the provision of secure cycle storage spaces, improvements to the local cycle network, a Travel Plan, a welcome pack, "cable to property" broadband, green infrastructure, and EVCP. Although it is anticipated that these mitigation measures should fully offset the calculated 'emissions cost', further mitigation measures may need to be implemented to ensure that this cost is fully offset.

9.6 Therefore, the proposed development is expected to comply with all relevant air quality policy. Air quality should not, therefore, pose any significant obstacles to the planning process.

Figures and Appendices

Figure 1: Site Location Plan

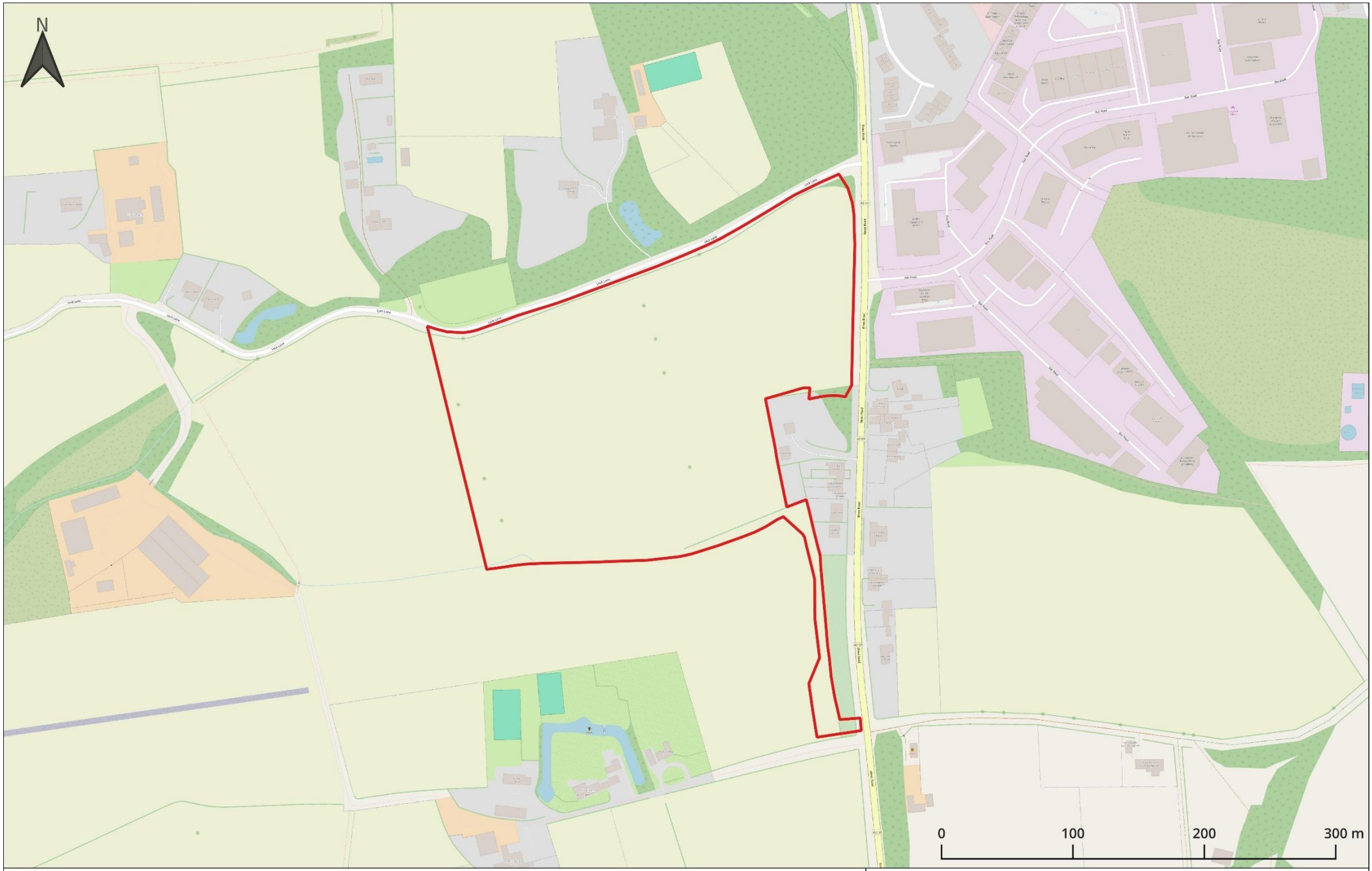

Figure 1: Site Location Plan

Job No: 12785
Author: B. McAllister
Date: 26/09/2024
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Figure 2: Construction Phase Receptors

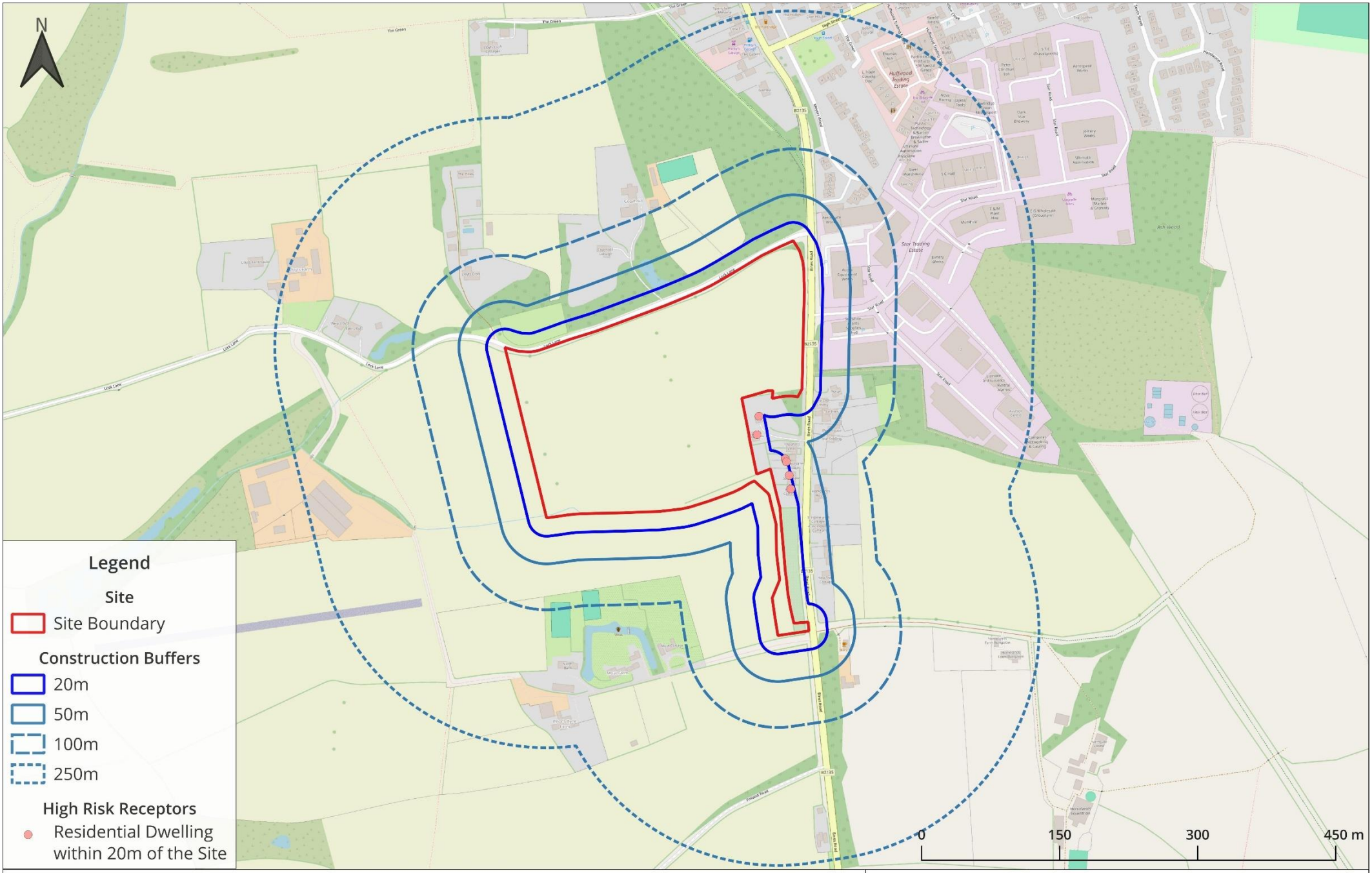

Figure 2: Construction Phase

Job No: 12785
Author: B. McAllister
Date: 26/09/2024
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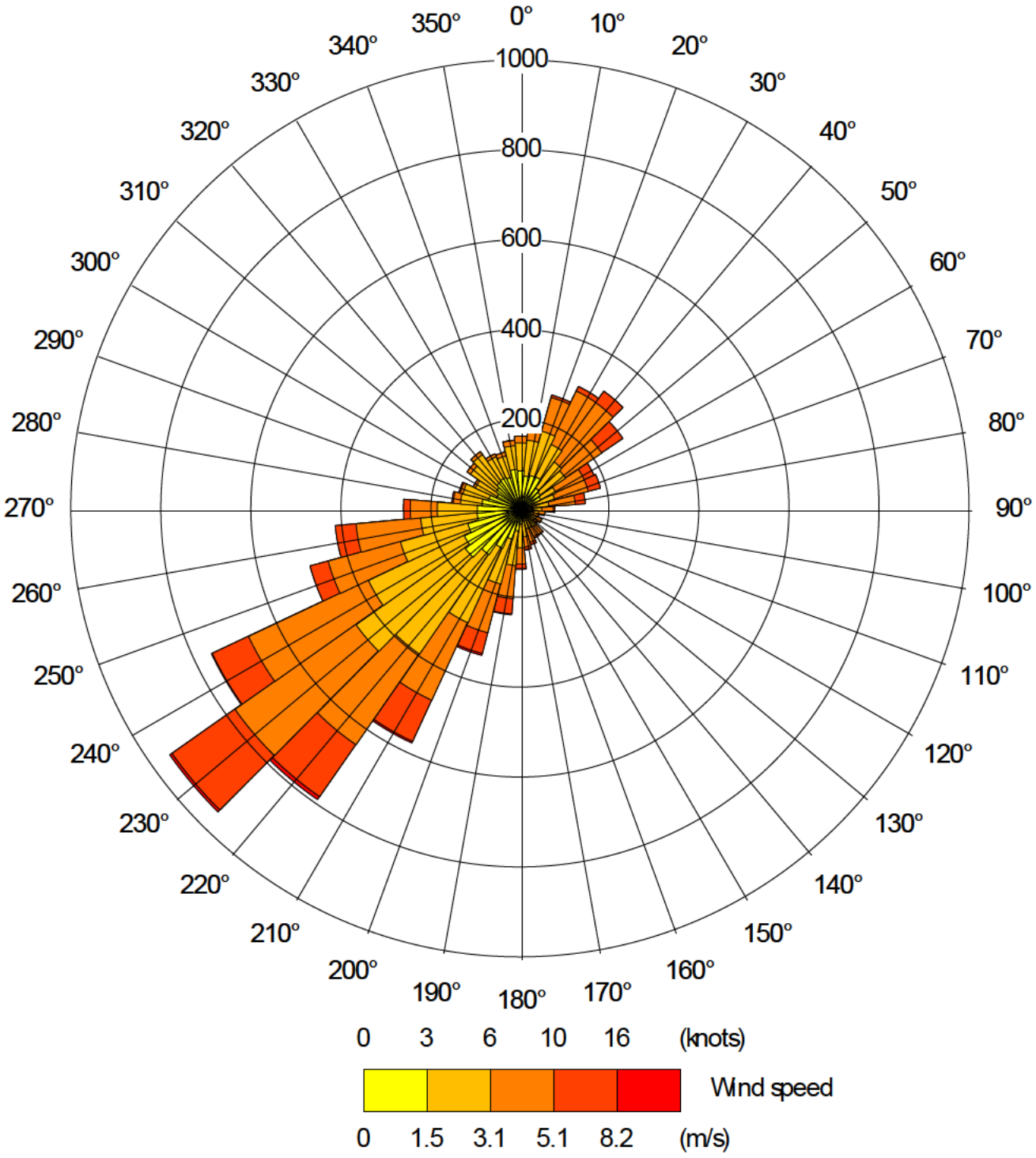
Figure 3: Wind Rose for Charlwood (2023)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310°
320°
330°
340°
350°
1000
800
600
400
200
0 3 6 10 16 (knots)
Wind speed
0 1.5 3.1 5.1 8.2 (m/s)

Appendix A: IAQM Highly Recommended Mitigation Measures for Medium Risk Sites

Appendix A: IAQM Highly Recommended Mitigation Measures for sites with a Medium Risk of Dust Impacts

Please refer to the IAQM's *Guidance on the assessment of dust from demolition and construction*[12] and Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (2018)[26] for further, "desirable", mitigation measures.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this Appendix. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exception incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by the IAQM[27] on *monitoring during demolition, earthworks and construction*.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.

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26 IAQM. (2018). *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites.* https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Trackout

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

and mud prior leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

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