

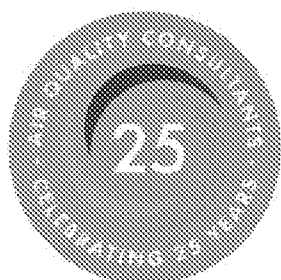
Land at Bayards, Eastergate
Air Quality Assessment
17th August 2021

Air Quality Assessment: Land at Bayards, Eastergate, Arun

August 2021



Experts in air quality
management & assessment



Document Control

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Executive Summary

The air quality impacts associated with the proposed residential development of land at Bayards in Eastergate, Arun, have been assessed. The development will consist of up to 69 dwellings and forms an extension to the approved scheme.

The proposed development is located well away from any busy roads in an area of good air quality, and the assessment has demonstrated that future residents of the proposed development will experience acceptable air quality, with pollutant concentrations well below the air quality objectives.

The proposed development will generate additional traffic on the local road network, but the assessment has shown that there will be no significant effects at any existing, sensitive receptor.

During the construction works a range of best practice mitigation measures will be implemented to reduce dust emissions and the overall effect will be 'not significant'; appropriate measures have been set out in this report, to be included in the Dust Management Plan for the works.

Overall, the construction and operational air quality effects of the proposed development are judged to be 'not significant'.

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1 Introduction

- 1.1 This report describes the potential air quality impacts associated with the proposed outline application for up to 69 residential units on land at Bayards in Eastergate, in the district of Arun. The proposed development will consist of up to 69 dwellings on an area of greenspace, and forms an extension to the approved scheme.
- 1.2 The proposed development will generate additional traffic on local roads, which may impact on air quality at existing residential properties along the affected road network. It will also introduce new residential exposure into the area. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).
- 1.3 The location and setting of the proposed development are shown in Figure 1, along with the nearby monitoring sites.



Figure 1: Proposed Development Setting in the Context of Air Quality

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- 1.4 The new homes within the proposed development will be provided with heat and hot water by individual boilers within each unit; there will be no centralised energy plant and thus no significant point sources of emissions within the proposed development.

- 1.5 There is also the potential for the construction activities to impact upon existing properties. The main pollutants of concern related to construction activities are dust and PM₁₀.
- 1.6 Consideration has also been given to the potential air quality impacts at the proposed development associated with the realignment of the A29 road, as well as the potential for cumulative effects from nearby committed developments.
- 1.7 This report describes existing local air quality conditions (base year 2019), and the predicted air quality in the future assuming that the proposed development proceeds. The assessment of traffic-related impacts focuses on 2023, which is the anticipated year of opening. The assessment of construction dust impacts focuses on the anticipated duration of the works.
- 1.8 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Arun District Council. An emissions mitigation cost calculation has been provided in accordance with the Sussex-air Air Quality and Emissions Mitigation Guidance document (Sussex-air Air Quality Partnership, 2020).

2 Policy Context

- 2.1 All European legislation referred to in this report is written into UK law and remains in place, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

Air Quality Strategy

- 2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Strategy 2019

- 2.3 The Clean Air Strategy (Defra, 2019b) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

- 2.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

- 2.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades.

Planning Policy

National Policies

- 2.6 The National Planning Policy Framework (NPPF) (2021a) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

“to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy”.

- 2.7 To prevent unacceptable risks from air pollution, Paragraph 174 of the NPPF states that:

“Planning policies and decisions should contribute to and enhance the natural and local environment by...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality”.

- 2.8 Paragraph 185 states:

“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 the wider area to impacts that could arise from the development”.

- 2.9 More specifically on air quality, Paragraph 186 makes clear that:

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

Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan”.

- 2.10 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2021b), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

“Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. 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, or where the need for emissions reductions has been identified”.

- 2.11 Regarding plan-making, the PPG states:

“It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality”.

- 2.12 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan *“identifies measures that will be introduced in pursuit of the objectives and can have implications for planning”*. In addition, the PPG makes clear that *“...dust can also be a planning concern, for example, because of the effect on local amenity”*.

- 2.13 Regarding the need for an air quality assessment, the PPG states that:

“Whether 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 have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity”.

- 2.14 The PPG sets out the information that may be required in an air quality assessment, making clear that:

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

- 2.15 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

“Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work

with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented”.

Local Transport Plan

2.16 The West Sussex Transport Plan 2011-2026 (West Sussex County Council, 2011), was adopted in February 2011, which after consultation with both the public and strategic partners, identified the following objectives:

- *“promoting economic growth;*
- *tackling climate change;*
- *providing access to services, employment and housing; and*
- *improving safety, security and health”.*

2.17 The Plan refers to specific strategic aims targeted for Arun, to tackle identified issues:

“Our strategy aims to tackle the identified transport issues as and when funding becomes available. To ensure that the regeneration aspirations of the coastal plain are delivered and the identified transport issues are addressed we will make certain that all new schemes and developments contribute and support in some way the following:

- *increasing use of sustainable modes of transport;*
- *improving network efficiency in order to improve journey time and air quality;*
- *improving safety for all road users;*
- *discouraging HGVs from using unsuitable roads; and*
- *improving accessibility between communities and larger towns within the District”.*

Local Policies

2.18 The Arun District Council Development Plan incorporates the Arun Local Plan 2011 – 2031, which was adopted in July 2018 (Arun District Council, 2018).

2.19 Policy QE SP1 of the Local Plan refers to *quality of the environment* and states that:

“The Council requires that all development contributes positively to the quality of the environment and will ensure that development does not have a significantly negative impact upon residential amenity, the natural environment or upon leisure and recreational activities enjoyed by residents and visitors to the District.

The location of existing industrial and commercial uses, including waste management uses, must be taken into consideration when assessing proposals for development sensitive to noise, light, odour and outputs to air. This is to ensure that land allocated for these uses are protected and to ensure that the amenity of new developments and facilities is safeguarded from the impacts of incompatible land uses."

2.20 Policy QE DM3 on air pollution states:

"All major development proposals will be required to assess the likely impacts of the development on air quality and mitigate any negative impacts by:

- Ensuring the development is located within easy reach of established public transport services;*
- Maximising provision for cycling and pedestrian facilities;*
- Encouraging the use of cleaner transport fuels on site, through the inclusion of electric car charging points; and*
- Contributing towards the improvement of the highway network where the development is predicted to result in increased congestion on the highway network.*

Development proposed nearby any Air Quality Management Area (AQMA) declared within the District within the Plan period, will require an air quality assessment to identify likely impacts of development upon the designated area. Developers will be required to ensure delivery of the actions set out within any Air Quality Action Plan.

Developments shall also be consistent with all other Local Plan policies."

Building Standards

- 2.21 Part F of the Building Regulations (Ministry of Housing, Communities & Local Government, 2020) sets legal requirements related to ventilation for buildings. It identifies performance criteria for ventilation systems for dwellings and offices, stating that nitrogen dioxide concentrations of 288 µg/m³ as a 1-hour average and 40 µg/m³ as a long-term average should not be exceeded. While these are building control requirements rather than planning requirements, they highlight that where ambient (outdoor) air exceeds the annual mean nitrogen dioxide objective, it is expected that an appropriate ventilation system will be installed to ensure that indoor concentrations are below the performance criterion.

Air Quality Action Plans

National Air Quality Plan

- 2.22 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018a) was published in October 2018 and

sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a CAZ. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

- 2.23 Arun District Council has not declared any AQMAs and thus has not prepared an air quality action plan.

3 Assessment Criteria

Health Criteria

- 3.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).
- 3.2 The UK-wide objectives for nitrogen dioxide and PM₁₀ were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The PM_{2.5} objective was to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m³ (Defra, 2021a). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM₁₀ objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m³ (Defra, 2021a). The predicted annual mean PM₁₀ concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM₁₀ objective. Where predicted annual mean concentrations are below 32 µg/m³ it is unlikely that the 24-hour mean objective will be exceeded.
- 3.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2021a). The annual mean objectives for nitrogen dioxide and PM₁₀ are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM₁₀ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.
- 3.4 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM₁₀ and PM_{2.5}, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government

does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

3.5 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM₁₀ and PM_{2.5}

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
PM ₁₀	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³ ^a
PM _{2.5} ^b	Annual Mean	25 µg/m ³

^a A proxy value of 32 µg/m³ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM₁₀ objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM₁₀ objective are possible (Defra, 2021a).

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

Construction Dust Criteria

3.6 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)¹ (2016) has been used. Full details of this approach are provided in Appendix A1.

Screening Criteria

3.7 Environmental Protection UK (EPUK) and the IAQM recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m² of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

3.8 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A1) inside an AQMA are a change in flows of more than 25 heavy duty vehicles or 100 light duty vehicles per day; outside of an AQMA the thresholds are 100 heavy duty vehicles or 500 light duty vehicles. Where these criteria are exceeded, a detailed assessment is likely to be required,

¹ The IAQM is the professional body for air quality practitioners in the UK.

although the guidance advises that *“the criteria provided are precautionary and should be treated as indicative”*, and *“it may be appropriate to amend them on the basis of professional judgement”*.

4 Assessment Approach

Consultation

4.1 The assessment follows a methodology agreed with Arun District Council via email correspondence between Nick Howard (Senior Environmental Health Officer at Arun District Council) and Paul Outen (Air Quality Consultants) held in July 2021. Specifically, the following key points were discussed and agreed:

- a construction dust risk assessment should be provided;
- the traffic generated by the development is sufficiently low enough for the assessment to adopt a qualitative approach;
- no quantitative assessment of the air quality conditions for future residents is required, due to the new homes being located well away from any significant sources of air pollution;
- an emissions mitigation assessment (i.e., a damage cost assessment) is required in accordance with the Sussex-air guidance (Sussex-air Air Quality Partnership, 2020);
- the cumulative impacts of consented schemes in the local area should be included in the assessment; and
- the potential for impacts on the development resulting from the construction and operation of the A29 realignment scheme should be considered.

Study Area

4.2 The study area for the assessment has been identified using professional judgement, focussing on the areas where impacts are anticipated to be greatest. It includes the application site itself and the roads along which the development will lead to a potentially significant change in traffic flows. Figure 1 in Section 1 of this report effectively shows the study area.

4.3 The construction dust assessment considers the potential for impacts within 350 m of the site boundary, or within 50 m of roads used by construction vehicles within 500m of the site. The specific areas considered are detailed in Section 6.

Existing Conditions

4.4 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2021c);

- local sources have been identified through examination of the Council's Air Quality Review and Assessment reports and from planning documents made available by Arun District Council for the A29 realignment scheme;
- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites, the latter being used to provide context for the assessment;
- background concentrations have been defined using Defra's 2018-based background maps (Defra, 2021b). These cover the whole of the UK on a 1x1 km grid. The background annual mean nitrogen dioxide maps for 2023 have been calibrated against concurrent measurements from national monitoring sites (AQC, 2020a). Mapped background concentrations of PM₁₀ and PM_{2.5} have not been adjusted;
- whether or not there are any exceedances of the annual mean limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020) (2021d). These are the maps used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to the required data quality standards, to identify and report exceedances of the limit value. The national maps of roadside PM₁₀ and PM_{2.5} concentrations (Defra, 2021d), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Construction Impacts

- 4.5 The construction dust assessment considers the potential for impacts within 350 m of the site boundary, or within 50 m of roads used by construction vehicles. The assessment methodology is that provided by IAQM (2016). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix A1 explains the approach in more detail.

Road Traffic Impacts

- 4.6 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.7 and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Assessment of Significance

Construction Dust Significance

- 4.7 Guidance from IAQM (2016) is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Operational Significance

- 4.8 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A3. Full details of the EPUK/IAQM approach are provided in Appendix A1.

Damage Cost Calculations

- 4.9 The calculation of damage costs has utilised the most recent EFT (Defra, 2021b), used to determine the development's transport emissions, alongside Defra's damage cost toolkit (Defra, 2021e), used to determine the associated damage costs for those emissions.
- 4.10 The calculation process includes:
- identifying the additional trips or vehicle numbers generated by the proposed development;
 - calculating the emissions from these trips for the pollutants of concern (NO_x and PM_{2.5}) using the EFT, for each of the five years assessed, starting with the year of opening (2023). This calculation has assumed a 10 km trip length and a 50 kph average speed;
 - calculating the damage costs for the specific pollutant emissions using the damage cost toolkit, based on the costs for road transport in a small urban area. The toolkit allows for reductions in emissions over time, applies a discount in line with HM Treasury's Green Book and also adjusts for inflation; and
 - extracting the 'Central' total value for each pollutant and summing these for use as the damage cost total for the scheme.

5 Baseline Conditions

Relevant Features

- 5.1 The proposed development is located in Eastergate, immediately south of Level Mare Lane and the Fontwell Park Racecourse. The site is bounded by trees to the west and south, beyond which are sparsely populated properties, cultivated land and green space. Phase 1 of the wider development, for which planning has been approved, is located immediately to the east. There is a small residential estate located approximately 120 m to the east.

Industrial Sources

- 5.2 No significant industrial or waste management sources have been identified that are likely to affect the proposed development, in terms of air quality or odour.

Local Air Quality Monitoring

- 5.3 Arun District Council does not operate any automatic monitoring stations within its area. The Council does, however, operate a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by South Yorkshire Air Quality Samplers (using the 50% TEA in acetone method). These include two sites located within 2.5 km of the proposed development. All other monitoring sites in Arun are located over 4 km away. Annual mean results for the years 2014 to 2019, where available, are summarised in Table 2, and the monitoring locations are shown in Figure 1. The monitoring data for 2014 have been taken from Arun District Council's 2019 Annual Status Report (Arun District Council, 2019), while data for 2015 to 2019 have been taken from the 2020 Annual Status Report (Arun District Council, 2020). No monitoring of PM₁₀ or PM_{2.5} concentrations is undertaken in Arun.

Table 2: Summary of Annual Mean NO₂ Monitoring (2014-2019) (µg/m³)

Site No.	Site Type	Location	2014	2015	2016	2017	2018	2019
Bog13	Roadside	Beachfield Park	13.0	21.0	25.8	25.7	28.0	24.0
Barn20	Roadside	Barnham Road	-	-	-	20.7	20.0	18.0
Objective			40					

- 5.4 There have been no exceedances of the objective at either monitoring site between 2014 and 2019. It should also be noted that there have been no exceedances at any other monitoring site in Arun during this time period. There are no clear trends in the data provided for either monitoring location.

Exceedances of Limit Value

- 5.5 There are no AURN (Defra, 2021f) monitoring sites within the study area with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2021d), which are used to identify and report exceedances of the limit value, do not identify any exceedances within the study area. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

Background Concentrations

- 5.6 Estimated background concentrations at the proposed development in the year of opening are set out in Table 3 and are all well below the objectives.

Table 3: Estimated Annual Mean Background Pollutant Concentrations in 2023 ($\mu\text{g}/\text{m}^3$)

Year	NO ₂	PM ₁₀	PM _{2.5}
2023	9.1	12.6	8.4
Objective	40	40	25 ^a

- ^a The 25 $\mu\text{g}/\text{m}^3$ PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

6 Construction Phase Impact Assessment

Construction Traffic

- 6.1 Typical traffic volumes generated by the site during the construction works will be considerably lower than the operational traffic generation, and well below the relevant screening criteria of 100 AADT for heavy vehicles and 500 AADT for light vehicles recommended by EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017). It is, therefore, not considered necessary to assess the impacts of traffic emissions during the construction phase.

On-Site Exhaust Emissions

- 6.2 The IAQM guidance (IAQM, 2016) states:

“Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur”.

- 6.3 The proposed development is relatively small and the areas within it in which NRMM and site traffic will typically operate will be set back from any sensitive properties. It is judged that there no risk of significant effects at existing receptors as a result of on-site machinery emissions.

Construction Dust and Particulate Matter Emissions

- 6.4 The construction works will give rise to a risk of dust impacts during earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see Appendix A1), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

- 6.5 There is no requirement for demolition on site.

Earthworks

- 6.6 The characteristics of the soil at the site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2021), as set out in Table 4. Overall, it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 4: Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Deep
Soil Parent Material Grain Size	Mixed (Argillaceous ^a - Rudaceous ^b)
European Soil Bureau Description	Colluvium
Soil Texture	Loam ^c to Sandy Loam

^a grain size < 0.06 mm.

^b grain size > 2.0 mm.

^c a loam is composed mostly of sand and silt.

- 6.7 The site covers 23,100 m², and the earthworks will include excavation for foundations and drainage, haulage of imported stone, tipping of aggregates, stockpiling of topsoil and landscaping. It is not currently known what time of year the works will be undertaken, nor the number of earth-moving vehicles active at any one time. Based on the example definitions set out in Table A1.1 in Appendix A1, and using elements of professional judgement, the dust emission class for earthworks is considered to be *medium*.

Construction

- 6.8 Construction will involve 69 brick built residential properties over a period of 95 weeks. There will be no piling, onsite concrete batching, or sand blasting. It is assumed that dust will arise from vehicles travelling over unpaved ground and the handling and storage of dusty materials. Based on the example definitions set out in Table A1.1 in Appendix A1, and using elements of professional judgement, the dust emission class for construction is considered to be *medium*.

Trackout

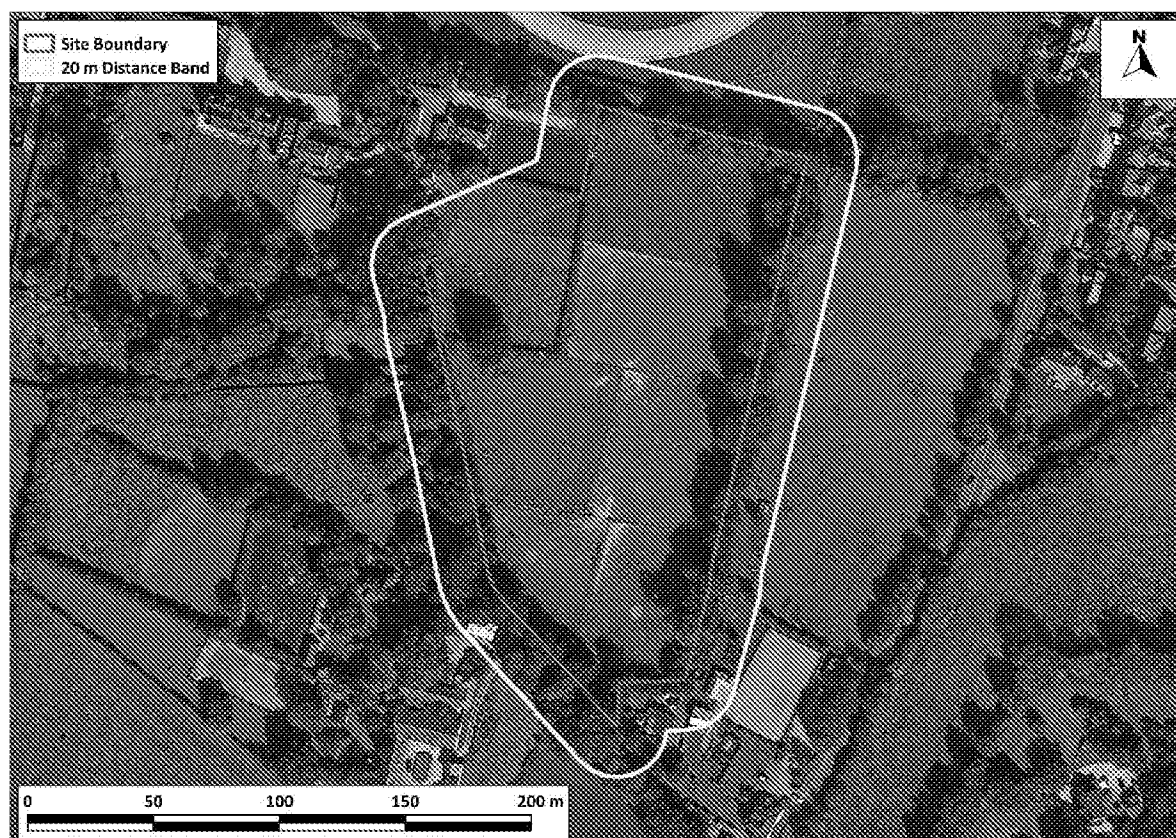
- 6.9 The number of heavy vehicles accessing the site, which may track out dust and dirt, is estimated to be eight per day. However, it is unlikely that the vehicles will travel over unpaved ground prior to leaving the site. Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for trackout is considered to be *small*.
- 6.10 Table 5 summarises the dust emission magnitude for the proposed development.

Table 5: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Small

Sensitivity of the Area

- 6.11 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM₁₀ concentrations.
- 6.12 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling (Table A1.2 in Appendix A1). Residential properties are also classified as being of 'high' sensitivity to human health effects, while places of work are classified as being of 'medium' sensitivity. There are less than ten residential properties within 20 m of the site (see Figure 2), which includes the consented Phase 1 properties located immediately east of the site which are not shown in Figure 2.

**Figure 2: 20 m Distance Band around Site Boundary**

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- 6.13 Table 5 shows that the dust emission magnitude for trackout is *small* and Table A1.3 in Appendix A1 thus explains that there is a risk of material being tracked 50 m from the site exit. It is proposed that access onto Level Mare Lane would be used to provide a (temporary) construction access for the proposed site. It is anticipated that all construction vehicles would travel to/from the A27 and via Fontwell Avenue. There are less than ten residential properties within 50 m of the roads along which material could be tracked (see Figure 3), which includes the consented Phase 1 properties located immediately east of the site which are not shown in Figure 3.



Figure 3: 50 m Distance Band around Roads Used by Construction Traffic Within 50 m of the Site Exit

Imagery ©2021 Google.

Sensitivity of the Area to Effects from Dust Soiling

- 6.14 Using the information set out in Paragraph 6.12 and Figure 2 alongside the matrix set out in Table A1.3 in Appendix A1, the area surrounding the onsite works is of 'medium' sensitivity to dust soiling. Using the information set out in Paragraph 6.13 and Figure 3 alongside the same matrix, the area is of 'low' sensitivity to dust soiling due to trackout.

Sensitivity of the Area to any Human Health Effects

- 6.15 The matrix in Table A1.4 in Appendix A1 requires information on the baseline annual mean PM₁₀ concentration in the area. The properties nearest the site are well away from local roads and the existing annual mean PM₁₀ concentration is best described by the background concentration from Table 3 (12.6 µg/m³)². Using the information set out in Paragraphs 6.12 and Figure 2 alongside the matrix in Table A1.4 in Appendix A1, the area surrounding the onsite works is of 'low' sensitivity to human health effects. Using the information set out in Paragraph 6.13 and Figure 3 alongside the same matrix, the area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity.

Sensitivity of the Area to any Ecological Effects

- 6.16 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. There are no designated ecological sites within 50 m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

Summary of the Area Sensitivity

- 6.17 Table 6 summarises the sensitivity of the area around the proposed construction works.

Table 6: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	Medium	Low
Human Health	Low	Low

Risk and Significance

- 6.18 The dust emission magnitudes in Table 5 have been combined with the sensitivities of the area in Table 6 using the matrix in Table A1.6 in Appendix A1, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 7. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 9 (step 3 of the assessment procedure).

² Whilst it is noted that construction is due to commence in 2022 and thus the background PM₁₀ concentration may be marginally higher than the presented value for 2023, this does not affect the overall judgement of sensitivity.

Table 7: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Earthworks	Medium Risk	Low Risk
Construction	Medium Risk	Low Risk
Trackout	Negligible Risk	Negligible Risk

- 6.19 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant' (IAQM, 2016).

7 Operational Phase Impact Assessment

Impacts at Existing Receptors

- 7.1 The proposed development is expected to generate a total of 385 daily light vehicle trips; this daily trip rate is below the screening threshold of 500 LDVs recommended for use outside of an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.8). As such, it is judged that the relevant screening thresholds will not be exceeded and there is no requirement for a detailed assessment of road traffic impacts at existing receptors; it can thus be concluded that the proposed development will not have a significant impact on local roadside air quality.

Impacts of Existing Sources on Future Residents of the Development

- 7.2 The proposed properties are located well away from any roads (by at least 18 m), in an area where pollutant concentrations would be expected to be close to background levels. Background concentrations at the site are well below the objectives (see Table 3), thus it can be concluded that future residents will experience acceptable air quality, and there is no need for more detailed assessment.

A29 Realignment

- 7.3 The proposed realignment of the A29 road is due to be completed in two phases; the first phase (the northern section of the new road) is from the A29 south of Eastergate Lane to a new junction with Barnham Road. This new junction will be located approximately 130 m south of the proposed development.

Construction Dust

- 7.4 The proposed road realignment scheme will involve extensive construction works; however, the air quality chapter of the Environmental Impact Assessment (EIA) (WSP, 2021) produced to support the planning application (planning reference: WSCC/052/20) for the scheme demonstrates that the air quality effects associated with the construction works, with the proposed mitigation in place, will be 'not significant' for receptors located within 200 m of the works. This includes existing residential properties located within 50 m of the construction area. Therefore, it is judged that the impacts of the construction of the A29 realignment on the future properties within the proposed development will be 'not significant'.

Road Traffic Emissions

- 7.5 The air quality chapter of the EIA (WSP, 2021) states that:

"All impacts on pollutant concentrations at receptors...in the opening year (2023) would be negligible. Concentrations of all pollutants would remain well below the AQS."

7.6 The receptors considered in the air quality chapter are shown in Figure 4. Receptors E17, E18 and E19 are all located immediately adjacent to the new junction and considerably closer than the new properties within the proposed development. Modelled concentrations at these receptors were all well below the objectives and the predicted impacts of the A29 realignment were all *negligible* and thus 'not significant'. Therefore, it can be judged with a high level of certainty that the air quality impacts of the realigned A29 road on the proposed development, once operational, will also be 'not significant'.

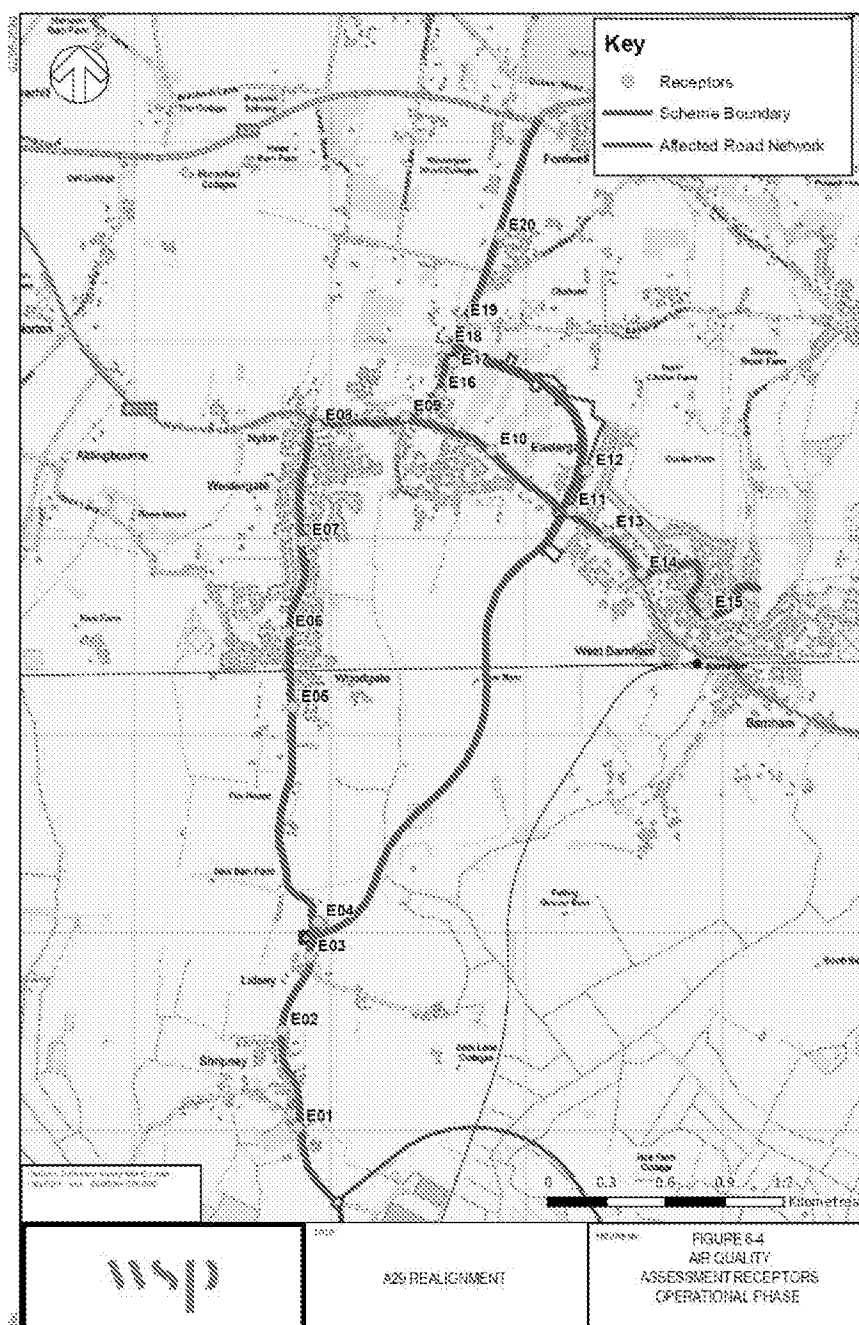


Figure 4: Receptors Considered in the Air Quality Chapter of the EIA for the A29 Phase 1 Realignment (WSP, 2021)

Cumulative Effects

- 7.7 There are a number of proposed and consented developments within the local area which may lead to an increase in traffic on the local road network, and thus the potential for cumulative air quality impacts of these schemes in combination with the proposed development has been considered.
- 7.8 The most significant local development is 'Land at Barnham, Eastergate and Westergate' which is described as *"up to 1,500 dwellings, community facilities, local centre (shops and services), a primary school and associated playing fields and early years provision (nursery)"* (planning reference: BN/112/20/EIS). The approximate location of this scheme in relation to the proposed development is shown in Figure 5.



Figure 5: Approximate Site Boundary of 'Land at Barnham, Eastergate and Westergate' Scheme and Location of Proposed Development

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- 7.9 AQC has carried out the air quality assessment, which forms a chapter of the EIA, to support the forthcoming planning application for this scheme; however, it is not publicly available at the time of this assessment. Nevertheless, whilst the chapter does not specifically include the in-combination effects of the traffic generated by the proposed development at land at Bayards, the inclusion of traffic emissions from a number of committed developments, coupled with uplifted baseline traffic to

account for local growth by 2024 and consideration of the realigned A29, demonstrate that the cumulative air quality effects will be 'not significant'.

- 7.10 Furthermore, it should be noted that the traffic generated by the proposed development will be below the screening threshold (see Paragraph 7.1) and it can thus be concluded that the proposed development will not have a significant impact on local roadside air quality regardless of the baseline traffic flows on the local roads in 2023 (the predicted year of opening).

Significance of Operational Air Quality Effects

- 7.11 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A1, and takes account of the assessment that:

- pollutant concentrations within the proposed development will all be well below the objectives, thus future residents will experience acceptable air quality; and
- the traffic generated by the proposed development will be below the screening threshold for requiring a detailed assessment, and thus the impacts of development-generated traffic have been screened out of the assessment and are 'not significant'.

8 Damage Cost Calculations

Background

- 8.1 The Sussex-air quality and emissions mitigation guidance (Sussex-air Air Quality Partnership, 2020) requires that all major developments complete an air quality damage costs calculation and mitigation statement. The emissions costs calculation refers to Defra's air quality damage costs approach (Defra, 2021d).
- 8.2 Defra developed the damage cost approach to enable proportionate analysis when assessing relatively small impacts on air quality. The damage costs are a set of impact values which were derived using the more detailed Impact Pathway Approach. These values estimate the societal costs associated with small changes in pollutant emissions. Combined with emission change estimates, they provide an approximate valuation of the aggregate societal impacts of a policy. Such impacts can then be set against the direct monetary costs of a scheme to provide a cost-benefit calculation. Thus, damage costs do not provide a figure for the abatement of emissions to a given level.
- 8.3 Abatement costs are usually derived from a marginal abatement cost curve (MACC) which gives the incremental cost of measures to achieve a certain outcome, such as the removal of an exceedance of the air quality objectives. However, the measures available and their associated costs are quite time-specific which means that they need to be updated in a regular basis. Defra's last MACC for NO₂ exceedances was produced several years ago and has now been withdrawn. There are therefore no Defra approved abatement costs for air quality currently available. Thus, while damage costs are not the same as abatement costs, they provide a current and available resource for assigning value to air pollution emissions.

Calculations

- 8.4 Paul Basham Associates, who has undertaken the Transport Assessment for the proposed development, has advised that the development will generate 385 additional vehicle trips per day, on average, all of which will be cars. The annual emissions from each of these trips in the five years from the year of opening have been calculated using the EFT and entered into Defra's damage cost toolkit. The calculations and results are presented in Table 8.

Table 8: Damage Cost Calculation

Year	2023	2024	2025	2026	2027
NO _x					
Total Emissions (tonnes)	0.308	0.279	0.251	0.225	0.201
Central Damage Cost (£/tonne) ^a	7,602	7,754	7,909	8,067	8,229
Discounted Central Cost (£)	2,344	2,087	1,851	1,638	1,443
Total Central Present Value (£)	£9,362				
PM _{2.5}					
Total Emissions (tonnes)	0.019	0.019	0.019	0.019	0.019
Central Damage Cost (£/tonne) ^a	67,831	69,187	70,571	71,982	73,422
Discounted Central Cost (£)	1,301	1,266	1,236	1,210	1,186
Total Central Present Value (£)	£6,199				

^a Road transport urban small

8.5 Summing the values for NO_x and PM_{2.5} gives a total damage cost of **£15,561**.

9 Mitigation

Good Design and Best Practice

9.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The proposed development incorporates the following good design and best practice measures, which have been accounted for in the assessment as far as is possible:

- provision of active charging points for electric vehicles for 20% of all parking spaces with cable-ducting provided at all remaining spaces to provide 'passive' provision for these spaces to receive electric vehicle charge points in the future, in accordance with the requirements of the Sussex-air Air Quality and Emissions Mitigation Guidance document (Sussex-air Air Quality Partnership, 2020);
- provision of cycle parking;
- provision of a Travel Plan for all new residents; and
- provision of dedicated cycle and pedestrian access to the proposed development.

9.2 Detailed mitigation measures costed to the value of the calculated damage cost of **£15,561**, which will be in addition to the minimum requirements set out in the Sussex-air Air Quality and Emissions Mitigation Guidance document (Sussex-air Air Quality Partnership, 2020), will be provided at Reserved Matters stage following approval of the outline planning permission for the proposed development.

Recommended Mitigation

Construction Impacts

9.3 Measures to mitigate dust emissions will be required during the construction phase of the development in order to minimise effects upon nearby sensitive receptors.

9.4 The site has been identified as a *Medium* Risk site during earthworks and construction and *Negligible* Risk for trackout, as set out in Table 7. Comprehensive guidance has been published by IAQM (2016) that describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on monitoring during demolition and construction (IAQM, 2018). This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix A4. The mitigation measures should be written into a dust management plan (DMP).

- 9.5 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Road Traffic Impacts

- 9.6 The assessment has demonstrated that the overall air quality effect of the proposed development will be 'not significant; it will not introduce any new exposure into areas of unacceptable air quality, nor will the development-generated traffic emissions have a significant impact on local air quality. It is, therefore, not considered appropriate to propose further mitigation measures for this development.
- 9.7 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law).

10 Residual Impacts

Construction

- 10.1 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. The mitigation measures set out in Section 9 and Appendix A4 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be 'not significant'.
- 10.2 The IAQM guidance does, however, recognise that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall the effects will be 'not significant'.

Road Traffic Impacts

- 10.3 The residual impacts will be the same as those identified in Section 6. The overall effects of the proposed development will be 'not significant'.

11 Conclusions

- 11.1 The assessment has considered the impacts of the proposed development on local air quality in terms of dust and particulate matter emissions during construction and emissions from road traffic generated by the completed and occupied development. It has also identified the air quality conditions that future residents will experience. Damage cost calculations have been carried out in accordance with the Sussex-air Air Quality and Emissions Mitigation Guidance document (Sussex-air Air Quality Partnership, 2020).
- 11.2 The assessment has been based on measurements made during 2019, and pre-pandemic activity and emissions forecasts, to ensure a worst-case assessment that does not take into account temporary reductions in pollutant concentrations as a result of reduced activity levels during the Covid-19 pandemic.

Construction Impacts

- 11.3 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emissions. Appropriate measures have been recommended and, with these measures in place, it is expected that any residual effects will be 'not significant'.

Operational Impacts

Impacts

- 11.4 Air quality conditions for future residents of the proposed development have been shown to be acceptable, with concentrations well below the air quality objectives throughout the site. Impacts of development generated traffic emissions on local air quality have also been shown to be 'not significant'.

Mitigation

- 11.5 Detailed mitigation measures costed to the value of the calculated damage cost of **£15,561** will be provided at Reserved Matters stage following approval of the outline planning permission for the proposed development.

Significance

- 11.6 The overall operational air quality effects of the proposed development are judged to be 'not significant'. This conclusion is based on the traffic generated by the proposed development being below the relevant screening threshold for requiring a detailed assessment and has thus been screened out of the assessment, while concentrations for future residents of the development will be well below the objectives.

Damage Cost Calculations

- 11.7 Damage cost calculations for NO_x and PM_{2.5}, carried out in accordance with the Sussex-air Air Quality and Emissions Mitigation Guidance document (Sussex-air Air Quality Partnership, 2020), give a total damage cost of **£15,561**; thus, additional mitigation will be required to this value and is to be agreed with Arun District Council. It should be noted that the damage cost approach was not developed to provide a figure for the abatement of emissions to a given level (see Paragraphs 8.1 and 8.3).

Policy Implications

- 11.8 Taking into account these conclusions, it is judged that the proposed development is consistent with Paragraph 185 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents. It is also consistent with Paragraph 186 as it will not affect compliance with relevant limit values or national objectives.
- 11.9 The proposed development is also consistent with Policies QE SP1 and QE DM3 of Arun District Council's Development Plan (which incorporates the Arun Local Plan 2011 – 2031) for the following reasons:
- it will not lead to further deterioration of existing poor air quality and will ensure that the development does not have a significantly negative impact upon residential amenity; and
 - design solutions have been used to address air quality issues rather than post-design mitigation, including the provision of electric vehicle charging points and cycling/pedestrian facilities.

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13 Glossary

AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EPUK	Environmental Protection UK
EU	European Union
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
LGV	Light Goods Vehicle
µg/m³	Microgrammes per cubic metre
MACC	Marginal Abatement Cost Curve
NO₂	Nitrogen dioxide
NPPF	National Planning Policy Framework

Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PM₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
PM_{2.5}	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
RDE	Real Driving Emissions
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide

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A1 Construction Dust Assessment Procedure

A1.1 The criteria developed by IAQM (2016) divide the activities on construction sites into four types to reflect their different potential impacts. These are:

- demolition;
- earthworks;
- construction; and
- trackout.

A1.2 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

A1.3 An assessment is required where there is a human receptor within 350 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), or where there is an ecological receptor within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

A1.4 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is *negligible* and that any effects will be 'not significant'. No mitigation measures beyond those required by legislation will be required.

STEP 2: Assess the Risk of Dust Impacts

A1.5 A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and
- the sensitivity of the area to dust effects (Step 2B).

A1.6 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

Step 2A – Define the Potential Dust Emission Magnitude

A1.7 Dust emission magnitude is defined as either 'Small', 'Medium', or 'Large'. The IAQM guidance explains that this classification should be based on professional judgement, but provides the examples in Table A1.1.

Table A1.1: Examples of How the Dust Emission Magnitude Class May be Defined

Class	Examples
Demolition	
Large	Total building volume >50,000 m ³ , potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20 m above ground level
Medium	Total building volume 20,000 m ³ – 50,000 m ³ , potentially dusty construction material, demolition activities 10-20 m above ground level
Small	Total building volume <20,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >10,000 m ² , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
Medium	Total site area 2,500 m ² – 10,000 m ² , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
Small	Total site area <2,500 m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10,000 tonnes, earthworks during wetter months
Construction	
Large	Total building volume >100,000 m ³ , piling, on site concrete batching; sandblasting
Medium	Total building volume 25,000 m ³ – 100,000 m ³ , potentially dusty construction material (e.g. concrete), piling, on site concrete batching
Small	Total building volume <25,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout^a	
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

^a These numbers are for vehicles that leave the site after moving over unpaved ground.

Step 2B – Define the Sensitivity of the Area

A1.8 The sensitivity of the area is defined taking account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM₁₀, the local background concentration; and
- site-specific factors, such as whether there are natural shelters to reduce the risk of wind-blown dust.

- A1.9 The first requirement is to determine the specific sensitivities of local receptors. The IAQM guidance recommends that this should be based on professional judgment, taking account of the principles in Table A1.2. These receptor sensitivities are then used in the matrices set out in Table A1.3, Table A1.4 and Table A1.5 to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

Step 2C – Define the Risk of Impacts

- A1.10 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the *risk* of impacts with no mitigation applied. The IAQM guidance provides the matrix in Table A1.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

- A1.11 The IAQM guidance provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided in the IAQM guidance has been used as the basis for the requirements set out in Appendix A4.

STEP 4: Determine Significant Effects

- A1.12 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant'.
- A1.13 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

Table A1.2: Principles to be Used When Defining Receptor Sensitivities

Class	Principles	Examples
Sensitivities of People to Dust Soiling Effects		
High	users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
Medium	users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the 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	parks and places of work
Low	the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land	playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads
Sensitivities of People to the Health Effects of PM₁₀		
High	locations where members of the public may be exposed for eight hours or more in a day	residential properties, hospitals, schools and residential care homes
Medium	locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	may include office and shop workers, but will generally not include workers occupationally exposed to PM ₁₀
Low	locations where human exposure is transient	public footpaths, playing fields, parks and shopping streets
Sensitivities of Receptors to Ecological Effects		
High	locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species	Special Areas of Conservation with dust sensitive features
Medium	locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition	Sites of Special Scientific Interest with dust sensitive features
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A1.3: Sensitivity of the Area to Dust Soiling Effects on People and Property ³

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

³ For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 500 m from sites with a *large* dust emission magnitude for trackout, 200 m from sites with a *medium* dust emission magnitude and 50 m from sites with a *small* dust emission magnitude, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table A1.4: Sensitivity of the Area to Human Health Effects ³

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

Table A1.5: Sensitivity of the Area to Ecological Effects ³

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

Table A1.6: Defining the Risk of Dust Impacts

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

A2 EPUK & IAQM Planning for Air Quality Guidance

- A2.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

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

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

Recommended Best Practice

- A2.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

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

- A2.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

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

- A2.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new “street canyon”, as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) “rapid charge” point per 10 residential dwellings and/or 1000 m² of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNO_x/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
 - Spark ignition engine: 250 mgNO_x/Nm³;
 - Compression ignition engine: 400 mgNO_x/Nm³;
 - Gas turbine: 50 mgNO_x/Nm³.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNO_x/Nm³ and 25 mgPM/Nm³.

A2.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

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

A2.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

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

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

Impacts of the Development on the Local Area

A2.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

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

A2.8 Coupled with any of the following:

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

A2.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A2.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A2.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

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

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

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

- A2.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

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

- A2.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

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

- A2.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

- A2.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

- A2.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either ‘significant’ or ‘not significant’. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A2.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A2.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A3.

A3 Professional Experience

Penny Wilson, BSc (Hons) CSci MEnvSc MIAQM

Ms Wilson is an Associate Director with AQC, with more than 20 years' relevant experience in the field of air quality. She has been responsible for numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including odours. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning applications. She has provided expert evidence to a number of Public Inquiries, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

Paul Outen, BSc (Hons) MEnvSc MIAQM

Mr Outen is a Principal Consultant with AQC, with over eleven years' experience in the assessment of air quality and odours. He undertakes air quality and odour assessments covering residential and commercial developments, industrial installations, road schemes, energy centres and mineral and waste facilities. These involve qualitative assessments, and quantitative modelling assessments using the ADMS dispersion models, for both planning and permitting purposes. He has also presented evidence at public hearings. Mr Outen has a particular interest in odour assessment, and has extensive experience in the assessment of odours across a wide range of industries throughout the UK, Europe and Asia. He also has experience in pollutant monitoring techniques. He regularly undertakes site audits for various installations to advise on pollution control and mitigation strategies. He is a Member of both the Institution of Environmental Sciences and Institute of Air Quality Management.

A4 Construction Mitigation

A4.1 Table A4.1 sets out a list of best-practice measures from the IAQM guidance (IAQM, 2016) that should be incorporated into the specification for the works. These measures should ideally be written into a Dust Management Plan. Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the Dust Management Plan.

Table A4.1: Best-Practice Mitigation Measures Recommended for the Works

Measure	Desirable	Highly Recommended
Communications		
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager		✓
Display the head or regional office contact information		✓
Dust Management Plan		
Develop and implement a Dust Management Plan (DMP) approved by the Local Authority which documents the mitigation measures to be applied, and the procedures for their implementation and management		✓
Site Management		
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken		✓
Make the complaints log available to the local authority when asked		✓
Record any exceptional incidents that cause dust and/or air emissions, either on- or 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 DMP, record inspection results, and make an inspection log available to the Local Authority when asked		✓
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions		✓
Preparing and Maintaining the Site		
Plan the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible		✓
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site		✓
Fully enclose site or specific operations where there is a high potential for dust production and the site is 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 their engines when stationary – no idling vehicles		✓
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable		✓
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	✓	
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials		✓
Implement a Travel Plan that supports and encourages sustainable staff travel (public transport, cycling, walking, and car-sharing)	✓	
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, conveyors and covered skips		✓
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate		✓
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods	✓	✓
Waste Management		
Avoid bonfires and burning of waste materials		✓
Measures Specific to Earthworks		
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable	✓	
Use Hessian, mulches or trackfiyers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	✓	
Only remove the cover from small areas during work, not all at once	✓	
Measures Specific to Construction		
Avoid scabbling (roughening of concrete surfaces), if possible	✓	

Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place		✓
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery	✓	
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust	✓	

