



Barratt David Wilson Homes

Residential Development at Rustington Golf Centre

Air Quality Assessment

Report No.: 444287-AQ01 (02)

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Summary

RSK Environment Ltd was commissioned to undertake a qualitative air quality assessment for a proposed development of 167 residential dwellings at Rustington Golf Centre, Golfers Lane, Rustington, West Sussex.

The application site lies within the jurisdiction of Arun District Council. The assessment has been undertaken with reference to existing air quality in the area and relevant air quality legislation, policy and guidance.

Construction phase impacts of the proposed development on local air may potentially arise due to the generation and re-suspension of dust and particulate matter during the construction phase. The risk of dust impacts during earthworks, construction and trackout activities were assessed according to a widely used methodology published by the Institute of Air Quality Management. Mitigation measures are recommended based on the potential dust risks and with the implementation of appropriate mitigation measures, no significant impacts are anticipated during the construction phase.

A qualitative impact assessment of the operational impacts was undertaken with reference to guidance from the Environmental Protection UK and Institute of Air Quality Management (EPUK-IAQM). Data provided by the project transport consultants predicted an increase in daily traffic flows for light duty vehicles which exceeded the EPUK-IAQM criteria on Golfers Lane, however there are no relevant existing sensitive receptors adjacent to Golfers Lane. The development flows are distributed on the wider road network with no further exceedance of the EPUK-IAQM criteria. Based on the screening criteria, no significant impacts are expected, and further assessment of the operational phase traffic is not considered to be required. However, in line with the Sussex Air guidance, an Emissions Mitigation Statement (January 2022, ref: 444287-AQ02 (01)) has been prepared.

The site is not located within an Air Quality Management Area. A review of baseline data (local monitoring data and modelled background concentrations from Defra) along with consideration of the distance the proposed dwellings are set back from the nearby A259, have led to the conclusion that pollutant concentrations at the application site will meet the relevant Air Quality Strategy objectives. Therefore, no significant impact on future residents in relation to local air quality is anticipated.

Based on the results of the assessment, it is judged that with appropriate construction phase mitigation, the proposed development complies with relevant national and local planning policies and that there are no air quality constraints.

Abbreviations

ADC	Arun District Council
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EC	European Commission
EPUK	Environmental Protection UK
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PM _{2.5}	Particulate matter of size fraction approximating to <2.5mm diameter
PM ₁₀	Particulate matter of size fraction approximating to <10mm diameter
RSK	RSK Environment Limited

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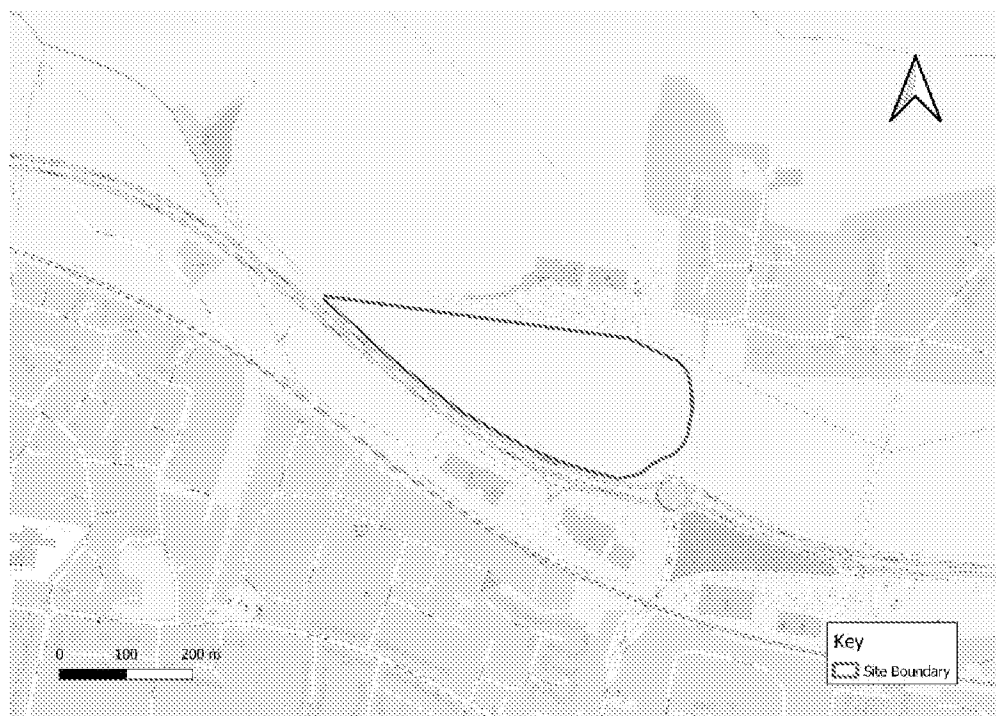
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1 INTRODUCTION

RSK Environment Limited (RSK) has been commissioned to undertake an assessment of potential air quality impacts associated with the proposed development at Rustington Golf Centre. The proposed development consists of 167 residential dwellings.

The site is within the jurisdiction of Arun District Council (ADC) and the approximate grid reference of the centre of the site is 505470, 103435 (British National Grid). The application site location is shown in Figure 1.1. The site is currently used as a pitch-and-putt course for Rustington Golf Centre with a large and mature tree belt running through the middle of it. It is bounded on the south by the A259 and will be accessed via Golf Lane to the east of the site.

Figure 1.1: Proposed Development Site Location



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This report presents the findings of an assessment of the existing baseline air quality and the potential impact on local air quality during both the construction and operational phases of the proposed development. Mitigation measures have been recommended where appropriate.

2 LEGISLATION, PLANNING POLICY AND GUIDANCE

2.1 Key Legislation

2.1.1 Air Quality Strategy

UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy. The latest *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air*, published in July 2007 sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.

The EU (European Unit) Air Quality Framework Directive (1996) established a framework under which the EU could set limit or target values for specified pollutants. The directive identified several pollutants for which limit or target values have been, or will be set in subsequent 'daughter directives'. The framework and daughter directives were consolidated by Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe, which retains the existing air quality standards and introduces new objectives for fine particulates (PM_{2.5}).

The Clean Air Strategy 2019 supersedes the policies outlined in the 2007 strategy. This latest strategy aims to have a more joined-up approach, outlining actions the Government plans to take to reduce emissions from transport, homes, agriculture and industry. However, the air quality objectives remain as previously detailed within the 2007 strategy.

2.1.2 Air Quality Objectives

The air quality standards (AQSs) in the United Kingdom are derived from European Commission (EC) directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the Air Quality Framework Directive into English Law. Directive 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010.

The relevant¹ AQS to England and Wales to protect human health are summarised in Table 2.1.

¹ Relevance, in this case, is defined by the scope of the assessment; see section 2.2.8.

Table 2.1: Air Quality Standards (AQS) Relevant to the Proposed Development

Substance	Averaging period	Exceedances allowed per year	Ground level concentration limit ($\mu\text{g}/\text{m}^3$)
Nitrogen dioxide (NO_2)	1 calendar year	-	40
	1 hour	18	200
Fine particles (PM_{10})	1 calendar year	-	40
	24 hours	35	50
Fine particles ($\text{PM}_{2.5}$)	1 year	-	25

2.1.3 The Environment Act

These objectives are to be used in the review and assessment of air quality by local authorities under Section 82 of the Environment Act (1995). If exceedances are measured or predicted through the review and assessment process, the local authority must declare an Air Quality Management Area (AQMA) under Section 83 of the act, and produce an Air Quality Action Plan (AQAP) to outline how air quality is to be improved.

2.2 Planning Policy

The land use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality concern that relates to land use and its development can, depending on the details of the proposed development, be a material consideration in the determination of planning applications.

2.2.1 National Planning Policy Framework

In July 2021, the revised National Planning Policy Framework (NPPF) was published, superseding the previous 2012 NPPF (revised in July 2018 and updated in February 2019) with immediate effect. The revised NPPF aims to “place greater emphasis on beauty, place-making, the environment, sustainable development and underlines the importance of local design codes.”

Section 15 of the NPPF deals with Conserving and Enhancing the Natural Environment, and states that the intention is that the planning system should prevent ‘*development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability*’ and goes on to state that ‘*new development [should be] appropriate for its location*’ and ‘*the effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account.*’

With specific regard to air quality, the NPPF states that: *“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in 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.”*

2.2.2 Local Planning Policy

Adoption Arun Local Plan 2011-2031 (July 2018)

The adopted local plan for Arun (‘Adoption Arun Local Plan 2011-2031’) includes Policy QE SP1: Quality of the Environment which states:

“The Council requires that all development contributes positively to the quality of the environment and will ensure that the 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 the amenity of new developments and facilities is safeguarded from the impacts of incompatible land uses.”

The Local Plan notes that there are currently no AQMAs declared within Arun, but that the cumulative impact of development needed to deliver housing numbers could have an adverse impact on some areas which already experience congestion. The requirement for measures which promote the use of cleaner fuels and improving access to sustainable modes of transport is noted, along with highway network improvements. Policy QE 3 DM3: Air Pollution states that:

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

- a. Ensuring the development is located within easy reach of established public transport services;*
- b. Maximising provision for cycling and pedestrian facilities;*
- c. Encouraging the use of cleaner fuels on site, through the inclusion of electric car charging points; and*
- d. 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 any 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...

2.3 Best Practice Guidance

2.3.1 Guidance on the Assessment of Dust from Demolition and Construction

The Institute of Air Quality Management (IAQM) published a guidance document (Holman *et al.*, 2014) on the assessment of construction phase impacts (herein the 'IAQM construction dust guidance'). The guidance was produced to provide advice to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM₁₀ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measure appropriate to the level of risk identified.

2.3.2 Local Air Quality Management Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by all UK local authorities in their air quality review and assessment work. This guidance, referred to in this document as LAQM TG16, has been used where appropriate. LAQM TG16 has been updated recently by Defra, adopting a new streamlined approach with a greater focus on local measures and public reporting.

2.3.3 Land-Use Planning & Development Control: Planning for Air Quality

Environmental Protection UK's (EPUK) and the IAQM jointly published a revised version of the guidance note 'Land-Use Planning & Development Control: Planning for Air Quality' in 2017 (herein the 'EPUK-IAQM guidance') to facilitate consideration of air quality within local development control processes. It provides a framework for air quality considerations, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes methods for undertaken an air quality assessment and an approach for assessing the significance of effects. The guidance note is widely accepted as an appropriate reference method for this purpose.

2.3.4 Air Quality and Emissions Mitigation Guidance for Sussex (2020)

This guidance has been produced by Sussex Air and deals with transport emissions and the control of dust during demolition and construction. The guidance aims to provide clarity on the requirements for air quality assessments and Emission Mitigation for proposed developments in both East and West Sussex. It hopes to address impacts on local air quality, ensure optimum scheme design to minimise emissions and exposure and also avoid unnecessary delays in the planning process. The guidance has been followed in the preparation of this air quality assessment report and the associated Emissions Mitigation Statement.

3 ASSESSMENT SCOPE AND METHODOLOGY

3.1 Overall Approach

The approach taken for assessing the potential air quality impacts of the proposed development may be summarised as follows:

- Correspondence with the Environmental Health Officer (EHO) at ADC;
- Baseline characterisation of local air quality;
- Qualitative assessment of the construction phase of the development;
- Qualitative assessment of air quality impacts during the operational phase of the proposed development; and
- Recommendation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

A method statement detailing the proposed scope and methodology was sent to ADC and confirmation was received that the air quality methodology proposed was satisfactory. An Emissions Mitigation Statement (January 2022, ref: 444287-AQ02 (01)) was requested by the EHO, in line with the Sussex Air guidance.

3.2 Baseline Characterisation

Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.

A desk-based study was undertaken including a review of monitoring data available from ADC and estimated background data from the United Kingdom Air Information Resource (UK-AIR) website maintained by Defra. Consideration was also given to potential sources of air pollution in the vicinity of the application site.

3.3 Construction Phase Impact Assessment

3.3.1 Construction Dust and Particulate Matter

Demolition and construction works for the proposed development have the potential to lead to the release of fugitive dust and particulate matter. An assessment of the likely significant effects of construction phase dust and particulate matter at sensitive receptors has therefore been undertaken following the IAQM's construction dust guidance.

Three separate dust impacts were considered:

- Annoyance of dust soiling;
- The risk of health effects due to an increase in exposure to PM₁₀; and
- Harm to ecological receptors.

In order to assess the potential impacts construction activities are divided into four types:

- Demolition;
- Earthworks;
- Construction; and
- Trackout².

The risk of dust and PM₁₀ arising to cause disamenity and/or health or ecological impacts was based on an assessment of likely emissions magnitude and the sensitivity of the surrounding environment. The risk category may be different for each of the four 'construction' activities.

Appendix A sets out the construction dust assessment methodology in detail as per IAQM construction dust guidance. Once the level of risk has been determined, then site specific mitigation proportionate to the level of risk can be identified.

3.3.2 Emissions to Air from Construction Traffic and Plant

Exhaust emissions from construction phase vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the application site and in the vicinity of the application site itself. Detailed information on the number of vehicles and plant associated with the construction phase is not available at this stage (and would not be until after appointment of the main construction contractors). Therefore, a qualitative impact assessment has been undertaken based on professional judgement and considering the following factors (where available):

- The likely duration of the construction phase;
- The potential number and type of construction traffic and plant that could be required; and
- The number and proximity of sensitive receptors to the application site and along the likely construction vehicle routes.

² Trackout is defined as the transport of dust and dirt from the construction / demolition sites onto public road network, where it may be deposited and then re-suspended by vehicles using the network.

3.4 Operational Phase Impact Assessment

3.4.1 Emissions to Air from Operational Phase Traffic

Once operational, the proposed development has the potential to generate traffic on the surrounding road network. The emissions to air associated with this traffic have the potential to impact on nearby sensitive receptors. The EPUK-IAQM guidance provides indicative criteria for when an air quality assessment is required, if none of the criteria are exceeded, it is considered unlikely that there will be any significant impacts on air quality during the operational phase. A simple 'screening level' assessment against these criteria has been undertaken.

3.4.2 Exposure of Future Residents to Air Pollution

The potential exposure of future residents of the proposed development has been considered by reviewing the baseline conditions (Section 4) and the locations of sensitive receptors within the proposed development, as well as considering the EPUK-IAQM guidance.

4 BASELINE AIR QUALITY CHARACTERISATION

4.1 Emissions Sources and Key Air Pollutants

The proposed development site is located in an area where the main source of air pollution is likely to be road traffic exhaust emissions, with the A259 located to the south of the site (further detail is provided within the operational phase impact assessment in Section 5).

The principal pollutants relevant to this assessment are considered to be nitrogen oxides (NO_x and NO_2), PM_{10} and $\text{PM}_{2.5}$, generally regarded as the most significant air pollutants released by vehicular combustion processes, or subsequently generated by vehicle emissions in the atmosphere through chemical reactions.

4.2 Presence of AQMAs

ADC does not have any AQMAs and thus the proposed development is not located in or adjacent to an AQMA.

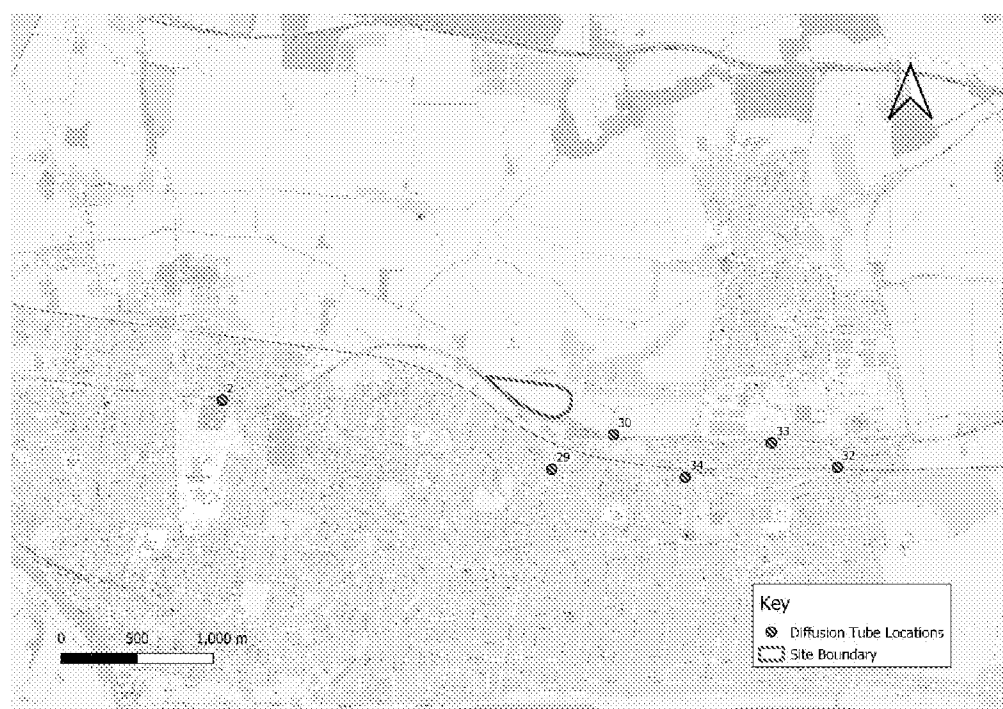
4.3 Local Authority Air Quality Monitoring Data

According to the ADC's 2021 Air Quality Annual Status Report, there was a network of 22 diffusion tube monitoring locations in 2020 and no automatic monitoring station. There were six diffusion tubes within 2.5km of the proposed development site. The annual mean NO_2 results from sites within 2.5km from the proposed development site are reproduced in Table 4.1 below. The annual average NO_2 concentrations for years 2016 - 2020 show that there were no exceedances of the annual mean NO_2 standard between 2016 and 2020. Figure 4.1 shows all six monitoring locations within 2.5km of the development site. Particulate matter monitoring data are not available in the vicinity (3km) of the site.

Table 4.1: Annual Mean Measured NO₂ Concentrations within 2.5km of the Proposed Development Site

Site ID	Location	Site type	Approximate Distance from Site (km)	Annual Mean NO ₂ Concentrations (µg/m ³)				
				2016	2017	2018	2019	2020
29	Mill Lane, Rustington	Roadside	0.5	-	-	-	-	17.8
30	A259, Rustington	Roadside	0.6	-	-	-	-	23.3
34	Station Road, Angmering	Roadside	1.1	-	-	-	-	13.4
33	Downs Way, East Preston	Roadside	1.6	-	-	-	-	11.6
2	Worthing Road, Littlehampton	Roadside	2.0	24.4	25.3	23.0	20.2	16.8
32	Old Worthing Road, East Preston	Roadside	2.1	-	-	-	-	15.6

Figure 4.1 Monitoring Locations within 2.5km of the Proposed Development Site



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4.3.1 Estimated Background Data

In addition to the local monitoring data, estimated background air quality data are available from the Local Air Quality Management (LAQM) website operated by Defra. The Defra LAQM website provides estimated annual average background concentrations of NO₂, PM₁₀ and PM_{2.5} on a 1km² grid basis.

Table 4.2 reproduced the estimated annual average background concentrations for the grid square containing the proposed development site for the years 2019 to 2023.

No exceedances of the NO₂, PM₁₀ or PM_{2.5} AQSs are predicted. As background concentrations are predicted to fall with time, background concentrations in future years would not be expected to exceed their respective annual mean standards.

Table 4.2: Estimated Background Annual Average NO₂, PM₁₀ and PM_{2.5} Concentrations at the Proposed Development Site

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Support Website (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
2019	11.1	13.8	9.6
2020	10.7	13.6	9.4
2021	10.3	13.4	9.2
2022	9.9	13.2	9.1
2023	9.6	13.1	9.0
Air Quality Objective	40	40	25*

Notes: Presented concentrations for 1km² grid centred on 505500, 103500; approximate centre of development site is 505470, 103435; *Target objective only.

Based on the local monitoring data and estimated background concentrations from Defra, exceedance of the annual mean NO₂, PM₁₀ and PM_{2.5} air quality objectives at the application site is considered unlikely to be exceeded, as discussed further in Section 5.2.

5 IMPACT ASSESSMENT

5.1 Construction Phase

Atmospheric emissions from construction activities will depend on a combination of the potential for emissions (the type of activity and prevailing conditions) and the effectiveness of control measures. In general terms, there are two sources of emissions that will need to be controlled to minimise the potential for adverse environmental effects:

- exhaust emissions from site plant, equipment and vehicles; and
- fugitive dust emissions from site activities.

5.1.1 Exhaust Emissions from Plant and Vehicles

The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing the pollutants NO_x, PM₁₀, volatile organic compounds (VOCs) and carbon monoxide (CO). The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition. The operation of site equipment, vehicles and machinery will result in emissions to atmosphere of exhaust gases, but such emissions are unlikely to be significant, particularly in comparison to levels of similar emission components from vehicle movements on the local road network surrounding the development site.

Construction traffic will comprise haulage/construction vehicles and vehicles used for workers' trips to and from the site. The greatest impact on air quality due to emission from construction phase vehicles will be in areas adjacent to the application site access and nearby road network. At this stage, it is estimated that there will be 10-50 HDV outward movements per day, which is considered unlikely to cause a significant impact on local air quality, in accordance with the EPUK-IAQM guidance.

5.1.2 Fugitive Dust Emissions

Fugitive dust emissions arising from construction activities are likely to be variable in nature and will depend upon the type and extent of the activity, soil type and moisture content, road surface conditions and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust.

Fugitive dust arising from construction and demolition activities is mainly of a particle size greater than the PM₁₀ fraction (that which can potentially impact upon human health). However, it is noted that demolition and construction activities may contribute to local PM₁₀ concentrations. Appropriate dust control measures can be highly effective for controlling emissions from potentially dust generating activities identified above, and adverse effects can be greatly reduced or eliminated.

5.1.3 Potential Dust Emission Magnitude

With reference to the IAQM criteria outlined in Appendix A, the dust emission magnitudes for earthworks, construction and trackout activities are summarised in Table 5.1. No demolition works are required at the site and therefore demolition activities have been screened out of the assessment. Where information is not yet known, a conservative approach has been adopted and professional judgement has been used based on the scale of the proposed development and experience of working on similar schemes.

Table 5.1: Summary of Dust Emission Magnitudes (Before Mitigation)

Activity	IAQM Criteria	Dust Emission Magnitude
Earthworks	- Total site area is >10,000m² - Soil type of the site – Data from the British Geological Society (BGS) suggests a mix of sand, silt and clay. Nearby borehole data from BGS shows sandy clay with occasional gravel in upper level. Therefore, soil type considered to be potentially dusty - Number of heavy earth moving vehicles active at any one time is unknown but given size of site it has the potential to be >10 - Height of bunds unknown - The estimated weight of material to be moved is unknown. - The time to undertake the earthworks is not yet confirmed, but given size of the site and likely phasing of masterplan, it is likely some earthworks may occur in the typically drier months.	Large
Construction	- Based on the number of proposed houses the total building volume has been estimated to be 25,000-100,000m³ - Construction materials are expected to include some fine / dusty materials - It is possible that on-site concrete batching will occur, but is unknown at this stage.	Medium - Large
Trackout	- The maximum number of heavy-duty vehicle (HDV) outward movements in any one day is not known but based on the size of the site is likely to be between 10-50 - The soil type of the surface material may be potentially dusty. - The length of unpaved roads on site is not known.	Medium

5.1.4 Sensitivity of the Area

The assessed sensitivity of the area takes into account a number of factors, including:

- 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, such as trees, to reduce the risk of wind-blown dust.

Consideration is given to human and ecological receptors and the roads along which trackout may occur. With regard to trackout routes, it is considered that construction traffic would access and exit the application site via Golfers Lane and then travel east or west on the A259. It is also possible, although less likely, that construction traffic could head south on Mill Lane.

Table 5.2 presents the determined sensitivity of the area. Construction activities are relevant up to 350m from the proposed development site boundary whereas trackout activities are only considered relevant up to 50m from the edge of the roads likely to be affected by trackout (up to 200m from the site access based on the medium dust risk magnitude), as per the IAQM guidance. Only 20m and 50m buffer areas have been considered for trackout for this reason.

The MAGIC Maps website indicates that there are no Special Areas of Conservation, Special Protection Areas, Ramsar sites, Sites of Special Scientific Interest, National Nature Reserves or Local Nature Reserves within 50m of the site boundary or potential routes along which trackout could arise. Impacts of ecological receptors are therefore not considered applicable and have not been considered further.

Table 5.2: Sensitivity of the Area

Potential Impact		Sensitivity of the Surrounding Area		
		Earthworks	Construction	Trackout
Dust soiling	Receptor sensitivity	High	High	High
	Number of receptors	1-10 (car showroom and 2-3 residential properties)	1-10 (car showroom and 2-3 residential properties)	1-10 (car showroom)
	Distance from the source	50-100m	50-100m	<20
	Overall Sensitivity of the Area	Low	Low	Medium
Human health	Receptor sensitivity	High	High	High
	Annual mean PM ₁₀ concentration	<24 µg/m ³	<24 µg/m ³	<24 µg/m ³
	Number of receptors	1-10 (car showroom and 2-3 residential properties)	1-10 (car showroom and 2-3 residential properties)	1-10 (car showroom)
	Distance from the source	50-100m	50-100m	<20
	Overall Sensitivity of the Area	Low	Low	Low

5.1.5 Risk of Impacts

The dust emission magnitudes from Table 5.1 have been combined with the sensitivity of the area from Table 5.2, to determine the risk of impacts of construction activities before mitigation as summarised in Table 5.3. The dust risk impact for both dust soiling and human health during all of the activities (earthworks, construction and trackout) were found to be low risk. Based on these dust risk categories, mitigation measures have been defined as detailed in Section 6 and Appendix B.

Table 5.3: Summary of the Dust Risk from Construction Activities

Potential Impact	Dust Risk Impact		
	Earthworks	Construction	Trackout
Dust soiling	Low Risk	Low Risk	Low Risk
Human health	Low Risk	Low Risk	Low Risk

5.2 Operational Phase

5.2.1 Emissions to Air from Operational Phase Traffic

During the operational phase, local air quality could be impacted from traffic exhaust emissions as a result of any changes in traffic flows or flow composition the proposed development may bring.

The project transport consultants, Abley Letchford Partnership Ltd, have provided traffic flow data in relation to the proposed development as presented in Table 5.4; these traffic flows are considered to be conservative as they are based on 196 dwellings. The traffic data shows an increase of 1012 vehicles (as 24-hour annual average daily traffic, AADT) on Golfers Lane which exceeds the EPUK-IAQM screening criteria; however, there are no relevant existing sensitive receptors adjacent to this stretch of Golfers Lane. Once the development traffic reaches the roundabout it will be distributed predominantly onto the A259, approximately 38% to the west and 48% to the east with the remaining 14% expected to travel south onto Mill Lane. The AADT flows for the A259 westbound, A259 eastbound and Mill Lane will all be below the EPUK-IAQM screening criterion of 500 AADT. It is understood that there are currently ongoing roadworks to widen some sections of the A259 (stretches that are currently single carriageway in each direction being made into dual carriageway). The project transport consultants have confirmed that the A259 immediately adjacent to the site is not included in these works (it is already a dual carriageway) and that the 'dualling' of the stretches to the west and the east of the site would not affect the traffic flows generated by the proposed development itself.

Table 5.5 presents a comparison of the relevant EPUK-IAQM screening criteria with data and information for the proposed development. Based on the screening criteria, no significant impacts are expected, and further assessment of the operational phase traffic

is not considered to be required. However, in line with the Sussex Air guidance, a Emissions Mitigation Statement is required for the site (due to be there being more than 10 dwellings proposed).

Table 5.4: Predicted Traffic Generation by the Proposed Development

Road link	2026 Baseline (Without Development)	2026 With Development	AADT generated by Proposed Development
Golfers Lane	454	1466	1012
A259 WB	33344	33729	385
Mill Lane	19470	19612	142
A259 EB	31456	31942	486

Table 5.5: Air Quality Screening Criteria from EPUK-IAQM Guidance and Comparison with the Proposed Development

EPUK-IAQM Screening Criteria	Comparison of proposed development to screening criteria
A change of Light Duty Vehicles (LDVs) of: More than 500 AADT (outside of AQMA)	Criterion exceeded: The traffic assessment confirms that an increase of 1012 AADT is anticipated on Golfers Lane, however, there are no existing relevant receptors adjacent to Golfers Lane. Once traffic distributes onto the wider road network, the criterium is not exceeded on the other road links.
A change of Heavy Duty Vehicles (HDVs) of: More than 100 AADT (outside of AQMA)	Criterion not exceeded: The HDV movements generated by the proposed development will not be significant and will not exceed 100 AADT.
Road realignment, where the change is 5m or more and the road is within an AQMA.	Criterion not exceeded: No realignment of existing roads proposed.
Introduction of a new junction or the removal of an existing junction near to relevant receptors. This applies to junctions that cause traffic to significantly change vehicle accelerate/ decelerate, e.g. traffic lights, or roundabouts.	Criterion not exceeded: No introduction of a new junction or removal of an existing junction adjacent to existing relevant receptors is proposed.
Introduction or change of a bus station, where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100A ADT elsewhere.	Criterion not exceeded: No bus station proposed
Have an underground car park with extraction system, where the ventilation extract for the car park will be within 20m of a relevant receptor.	Criterion not exceeded: There is no underground car park.

EPUK-LAQM Screening Criteria	Comparison of proposed development to screening criteria
Coupled with the car park having more than 100 movements per day (total in and out).	
Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.	Criterion not exceeded: It is understood that substantial combustion processes are not proposed.

5.2.2 Emissions to Air from Operational Phase Energy Plant

No significant combustion sources such as Combined Heat and Power (CHP) plant or large boilers are proposed with the proposed development. Should any such sources be proposed, further assessment of potential air quality impacts may be required.

5.2.3 Exposure of Future Users to Air Pollution

Baseline air quality data for the local area has been presented in Section 4. Based on the site masterplan, the new dwellings are expected to be set back from the A259 by at least 30m. Pollutant concentrations tend to reduce quickly as the distance from the road increases, as acknowledged in LAQM.TG16. The nearest ADC monitoring location to the site, is tube 30 which is approximately 0.3km east. Tube 30 is north of the A259, as is the proposed development site but the diffusion tube is roadside (attached to a lamppost approximately 2m from the roads edge), whereas the proposed dwellings are expected to be set back by at least 30m and it is reasonable to assume pollutant concentrations would be lower at locations of relevant exposure within the application site. Tube 30 was only installed in 2020 and therefore the Covid-19 pandemic needs to be considered when interpreting the data available from this location. However, the annual mean NO₂ concentrations measured in 2020 were well comfortably below the AQS objective.

Taking the baseline air quality information, presented in Section 4 into account and the setback distance, it is considered that potential exposure of future residents to poor air quality will be insignificant.

6 MITIGATION MEASURES & RESIDUAL IMPACTS

6.1 Construction Phase Mitigation

The dust emitting activities outlined in Section 5.1 can be effectively controlled by appropriate dust control measures and any adverse effects can be greatly reduced or eliminated. The dust risk categories identified have been used to recommend appropriate, site-specific mitigation measures, and are presented in Appendix B.

It is recommended that an appropriate selection of best practice mitigation measures are implemented to minimise the effects of construction plant, and traffic moving to and from site have on local air quality where practicable. Such measures may include:

- Minimising on-site parking;
- Providing secure cycle parking and encouraging the use of public transport; and
- Considering enforcing requirements for non-road mobile machinery (NRMM) to comply with the NO_x, particulate matter and carbon monoxide (CO) emissions standards specified in the EU Directive 97/68/EC (including subsequent amendments) and subsequent amendments as a minimum, where they have net power of between 37kW and 560kW. The emissions standards vary depending on the net power the engine produces.

6.2 Operational Phase Mitigation

As identified in Section 5.2, no significant operational phase impacts are anticipated on local air quality. However, the Sussex Air guidance requires the preparation of an Emissions Mitigation Statement. The Emissions Mitigation Statement (January 2022, 444287-AQ02 (01)) aims to further minimise any operational phase traffic emissions associated with the proposed development.

6.3 Residual Impacts

With the implementation of the proposed construction phase mitigation measures (detailed in Appendix B), the residual impacts are considered to be negligible. No significant impacts are anticipated once operational, therefore operational phase impacts are considered to remain of negligible significance.

7 CONCLUSIONS

An air quality assessment has been prepared for the proposed development of 167 residential dwellings at Rustington Golf Centre with reference to existing air quality in the area and relevant air quality legislation, policy and guidance.

An assessment of the potential for fugitive dust emissions to affect amenity and human health has been undertaken following the IAQM construction dust guidance. The potential risk of construction phase impacts was low for both dust soiling and human health. Mitigation measures have been recommended to reduce the risk of dust and particulate matter being generated and re-suspended. With implementation of the appropriate measures, relating to both dust and construction-related vehicle and plant operation, no significant impacts are anticipated during the construction phase.

A qualitative impact assessment of the operational impacts was undertaken with reference to the EPUK-IAQM guidance. Data provided by the project transport consultants predicted an increase in AADT flows for LDVs which exceeded the EPUK-IAQM criteria on Golfers Lane, however there are no relevant existing sensitive receptors adjacent to Golfers Lane. The development flows are distributed on the wider road network with no further exceedance of the EPUK-IAQM criteria. Based on the screening criteria, no significant impacts are expected, and further assessment of the operational phase traffic is not considered to be required. However, in line with the Sussex Air guidance, an Emissions Mitigation Statement has been prepared for the proposed development.

The site is not located within an AQMA. A review of baseline data (local monitoring data and Defra modelled background concentrations) along with consideration of the distance the proposed dwellings are set back from the A259, have led to the conclusion that pollutant concentrations at the application site will meet the relevant AQS objectives. Therefore, no significant impact on future residents in relation to local air quality is anticipated.

Based on the results of the assessment, it is judged that with appropriate construction phase mitigation, the proposed development complies with relevant national and local planning policies and that there are no air quality constraints.

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APPENDIX A – CONSTRUCTION DUST ASSESSMENT METHODOLOGY

This appendix contains the construction dust assessment methodology used in the assessment.

To assess the potential impacts, construction activities are divided into demolition, earthworks, construction and trackout. The descriptors included in this section are based upon the IAQM 2014 guidance. The assessment follows the steps recommended in the guidance.

Step 1: Screen the requirement for assessment

The first step is to screen out the requirement for a construction dust assessment, this is usually a somewhat conservative level of screening. An assessment is usually required where there is:

- a ‘human receptor’ within:
 - 350m of the boundary of the site; or
 - 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance(s).
- an ‘ecological receptor’:
 - 50m of the boundary of the site; or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

Step 2A: Defining the Potential Dust Emission Magnitude

Demolition

The dust emission magnitude category for demolition is varied for each site in terms of timing, building type, duration and scale. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large:** Total building volume >50,000m³, potentially dusty construction material, on-site crushing and screening, demolition activities >20m above ground level;
- **Medium:** Total building volume 20,000m³ – 50,000m³, potentially dusty construction material, demolition activities 10m – 20m above ground level; and
- **Small:** Total building volume <20,000m³, construction material with low potential for dust release, demolition activities <10m above ground, demolition during wetter months.

Earthworks

The dust emission magnitude category for earthworks is varied for each site in terms of timing, geology, topography and duration. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large:** Total site area >10,000m², potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 – 10,000m², moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes; and

- **Small:** Total site area < 2,500m², soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <10,000 tonnes, earthworks during wetter months.

Construction

The dust emission magnitude category for construction is varied for each site in terms of timing, building type, duration, and scale. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large:** Total building volume >100,000m³, piling, on site concrete batching;
- **Medium:** Total building volume 25,000 – 100,000m³, potentially dusty construction material (e.g. concrete), piling, on site concrete batching; and
- **Small:** Total building volume <25,000m³, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

Factors which determine the dust emission magnitude class of trackout activities are vehicle size, vehicle speed, vehicle number, geology and duration. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large:** >50 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- **Medium:** 10 – 50 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m; and
- **Small:** <10 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health and ecosystems. The sensitivity of the area takes into account the following 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 such as trees, to reduce the risk of wind-blown dust.

Table A1 was used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table A1: Sensitivity of the Area Surrounding the Site

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	• Users can reasonably expect a enjoyment of a high level of amenity. • The appearance, aesthetics or value of their property would be diminished by soiling. • 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. • Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	• Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) • Examples include residential properties, hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	• Locations with an international or national designation and the designated features may be affected by dust soiling. • Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. • Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
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. • The appearance, aesthetics or value of their property could be diminished by soiling. • 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. • Examples include parks and places of work.	• Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Examples include office and shop workers, but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation.	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. • Locations with a national designation where the features may be affected by dust deposition. • Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
Low	- The enjoyment of amenity would not reasonably be expected. - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. - 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. - Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	- Locations where human exposure is transient. - indicative examples include public footpaths, playing fields, parks and shopping streets.	- Locations with a local designation where the features may be affected by dust deposition. - Example is a local Nature Reserve with dust sensitive features.

Based on the sensitivities assigned of the different types of receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification for the area can be defined for each. Tables A2 to A4 indicate the method used to determine the sensitivity of the area for dust soiling, human health and ecological impacts, respectively.

For trackout, as per the guidance, it is only considered necessary to consider trackout impacts up to 50m from the edge of the road.

Table A2: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distances 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

Table A3: Sensitivity of the Area to Human Health Impacts

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

Receptor Sensitivity	Annual Mean PM ₁₀ Conc.	Number of Receptors	Distances from the Source (m)				
			<20	<50	<100	<200	<350
	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	>32µg/m ³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32µg/m ³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28µg/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 A4: Sensitivity of the area to Ecological Impacts

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

Step 2C: Defining the Risk of Impacts

The final step is to use both the dust emission magnitude classification with the sensitivity of the area, to determine a potential risk of impacts for each construction activity, before the application of mitigation. Tables A5 to A7 indicate the method used to assign the level of risk for each construction activity.

Table A5: Risk of Dust Impacts from Demolition

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

Table A6: Risk of Dust Impacts from Earthworks/Construction

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

Table A7: Risk of Dust Impacts from Trackout

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

APPENDIX B - SITE-SPECIFIC CONSTRUCTION PHASE RECOMMENDED MITIGATION MEASURES

The 2014 IAQM guidance divides site-specific mitigation measures are divided into general measures applicable to all sites, and measures specific to demolition, earthworks, construction and trackout. Depending on the level of risk assigned in relation to each type of construction activity, different mitigation is assigned. The method for assigning mitigation measures as detailed in the IAQM guidance has been used, along with professional judgement. For those 'general' mitigation measures, the greatest risk category assigned to the assessed construction activities should be applied. Therefore, in this case, the 'low risk' 'general' site mitigation measures have been recommended.

There are two categories of mitigation measure – 'highly recommended' and 'desirable', which are indicated according to the dust risk level identified in Table 5.3. Desirable measures are presented in *italics*.

Communications

- Display the name and contact details of people accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Dust Management

- *Develop and implement a DMP, which may include measures to control other emissions, approved by the Local authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures. The desirable measures should be included as appropriate for the site. The DMP should include details of visual inspections.*

Site Management

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

Monitoring

- *Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority if asked. This should include regular dust soiling checks of surfaces such as street*

furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.

- Carry out regular site inspections to monitor compliance with any dust management plan, 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 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 Vehicles/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- *Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas, where applicable.*

Operations

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

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.

Specific to Trackout

- *Use water-assisted dust sweeper on the access and local roads, to remove, as necessary, any material tracked out of the site.*
- *Avoid dry sweeping of large areas.*
- *Ensure vehicles entering and leaving sites are covered to prevent the escape of materials during transport.*
- *Record any inspections of haul routes and subsequent action in site log book.*
- *Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).*