Air Quality Statement

Denhams, Andrews Hill, Billinghurst

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Crown House
27 Old Gloucester Street
London, WC1N 3AX

Union House
111 New Union Street
Coventry, CV1 2NT

T: 0800 689 4329
E: info@gemairquality.co.uk
www.gemairquality.co.uk

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Client Details:

Chris & Rona Williamson
Denhams
Andrews Hill
Billingshurst
West Sussex
RH14 9JT

Produced By:

GEM Air Quality Ltd
Union House
111 New Union Street
Coventry
CV1 2NT

Tel: 0800 689 4329
Email: info@gemairquality.co.uk
www.gemairquality.co.uk

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1 INTRODUCTION

1.1 Scope

GEM Air Quality Ltd has been commissioned to undertake an air quality statement for a proposed residential development located at Denhams, Andrews Hill in Billingshurst, West Sussex. The proposals are for the construction of three dwellings, with associated car parking and cycle storage.

Based on the screening checklist contained in the "*Air quality and emissions mitigation guidance for Sussex (2021)*" an air quality assessment and an emissions mitigation assessment are not required as none of the criteria are met.

Furthermore, air quality exposure is not considered an issue as the proposed development is located adjacent to a road with vehicle movements below 10,000 AADT. Local air quality monitoring in Billinghurst indicates that roadside concentrations are well below the relevant air quality objective (40 µg/m^3). These are summarised in Table 1 below.

Table 1 – Local Air Quality (NO_2) Monitoring, µg/m^3

Site ID	Site Name	Type	2019	2020	2021	2022	2023
28	Billinghurst 1	Roadside	26.2	23.8	22.2	20.3	19.7

The remainder of this air quality statement has focused on the impacts during the construction phase, as well as discussion of relevant mitigation measures throughout the operational phase.

2 PLANNING POLICY & GUIDANCE

2.1 Construction Phase

The Institute of Air Quality Management (IAQM) has published guidance on the assessment of dust from construction and demolition[1]. Based on this guidance, the main air quality impacts that may arise during construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM_{10} and $PM_{2.5}$ concentrations, as a result of dust generating activities on site; and
- an increase in concentrations of PM_{10}, $PM_{2.5}$ and nitrogen dioxide due to exhaust emissions from vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

In relation to the most likely impacts, the guidance states the following:

"*The most common impacts are dust soiling and increased ambient PM_{10} (including $PM_{2.5}$) concentrations due to dust arising from activities on the site. Dust soiling will arise from the deposition of dust and this is most relevant to disamenity, rather than health effects.*

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".

The guidance continues by providing an assessment procedure. This includes sub-dividing construction activities into four types (demolition, earthworks, construction and track out) to reflect their different potential impacts.

With regards to the proposed development the potential for dust emissions is assessed for each activity that is likely to take place. The assessment procedure assumes no mitigation measures are applied. The conditions with no mitigation thus form the baseline or "do-nothing" situation for a construction site.

[1] IAQM Guidance on the assessment of dust from demolition and construction (January 2024, v2.2), Institute of Air Quality Management, London

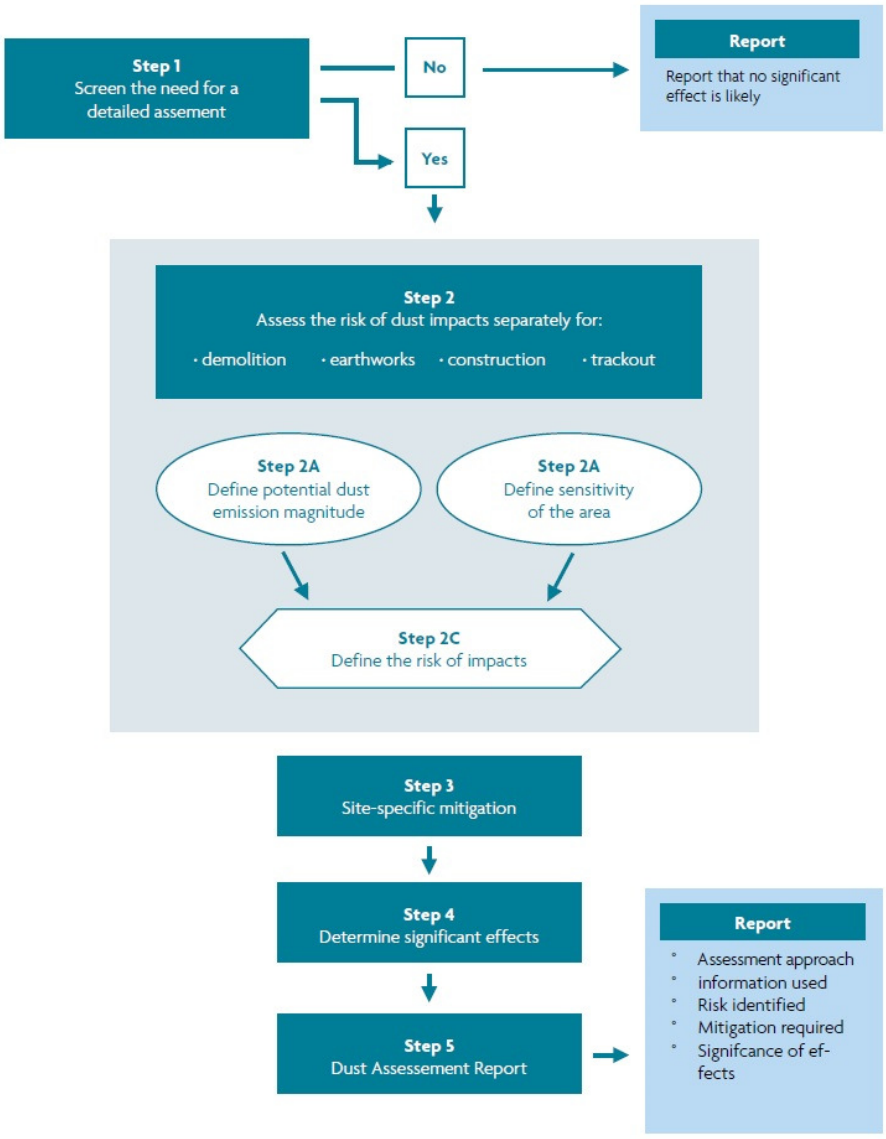
3 CONSTRUCTION PHASE

3.1 Methodology

Using the guidance published by the Institute of Air Quality Management (IAQM) the potential for dust emissions to be generated during the construction phase has been assessed for each activity that is likely to take place.

The conditions with no mitigation thus form the baseline or "do-nothing" situation for a construction site. The assessment procedure uses the steps provided in the guidance and summarised in Figure 1.

Figure 1 – Dust Assessment Procedure



The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk. A development is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (see Table 2); and
- the sensitivity of the area to dust impacts, which is defined as low, medium or high sensitivity (see Tables 3 and 4).

These two factors are combined to determine the risk of dust impacts with no mitigation applied (see Table 5). The risk category assigned to the development can be different for each of the four potential activities (demolition, earthworks, construction and track out).

Table 2 – Dust Emission Magnitude

Activity	Dust Emission Class		
	Large	Medium	Small
Demolition	Total building volume >75,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level	Total building volume 12,000 – 75 000m^3, potentially dusty construction material, demolition activities 6-12 m above ground level	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months
Earthworks	Total site area >110,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height	Total site area 18,000 m^2 – 110,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m - 6m in height	Total site area <18,000 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height
Construction	Total building volume >75,000 m^3, piling, on site concrete batching; sandblasting	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Track out	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m	20-50 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	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

Table 3 – Sensitivity of the Area to Dust Soiling Effects on People and Property

Sensitivity of the Area to Dust Soiling Effects					
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

Table 4 – Sensitivity of the Area to Human Health Impacts

Sensitivity of the Area to Human Health Effects							
Receptor Sensitivity	Annual Mean PM_{10} Concentration	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	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table 5 – Risk of Dust Impacts

Construction Activity	Sensitivity of 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
Track out	High	High Risk	Low Risk	Low Risk
	Medium	Medium Risk	Low Risk	Negligible
	Low	Low Risk	Low Risk	Negligible

3.2 Construction Impact Assessment

The assessment of construction activities has focused on demolition, earthworks, construction and track out activities at the site. Using the criteria provided in Table 2 the dust emission magnitude for each activity is as follows:

- Demolition = N/A;
- Earthworks = Small (Total site area <18,000 m^2);
- Construction = Small (Total building volume <12,000 m^3); and
- Track out = Small (<20 HDV (>3.5t) outward movements in any one day).

The sensitivity of the surrounding area to dust soiling and human health (Table 6) is then defined based on the criteria in Tables 4 and 5, which includes the number of highly sensitive receptors that fall within a certain distance of the proposed construction phase (see Figure 2). There are no designated ecological receptors within 50 metres of the proposed development.

Table 6 – Sensitivity of the Surrounding Area

Potential Impact	Comments	Sensitivity
Dust Soiling	There are between 1 and 10 high sensitivity receptors e.g. residential dwellings, within 20 metres of the proposed development.	Medium
Human Health	There are between 1 and 10 high sensitivity receptors e.g. residential dwellings, within 20 metres of the proposed development.	Low

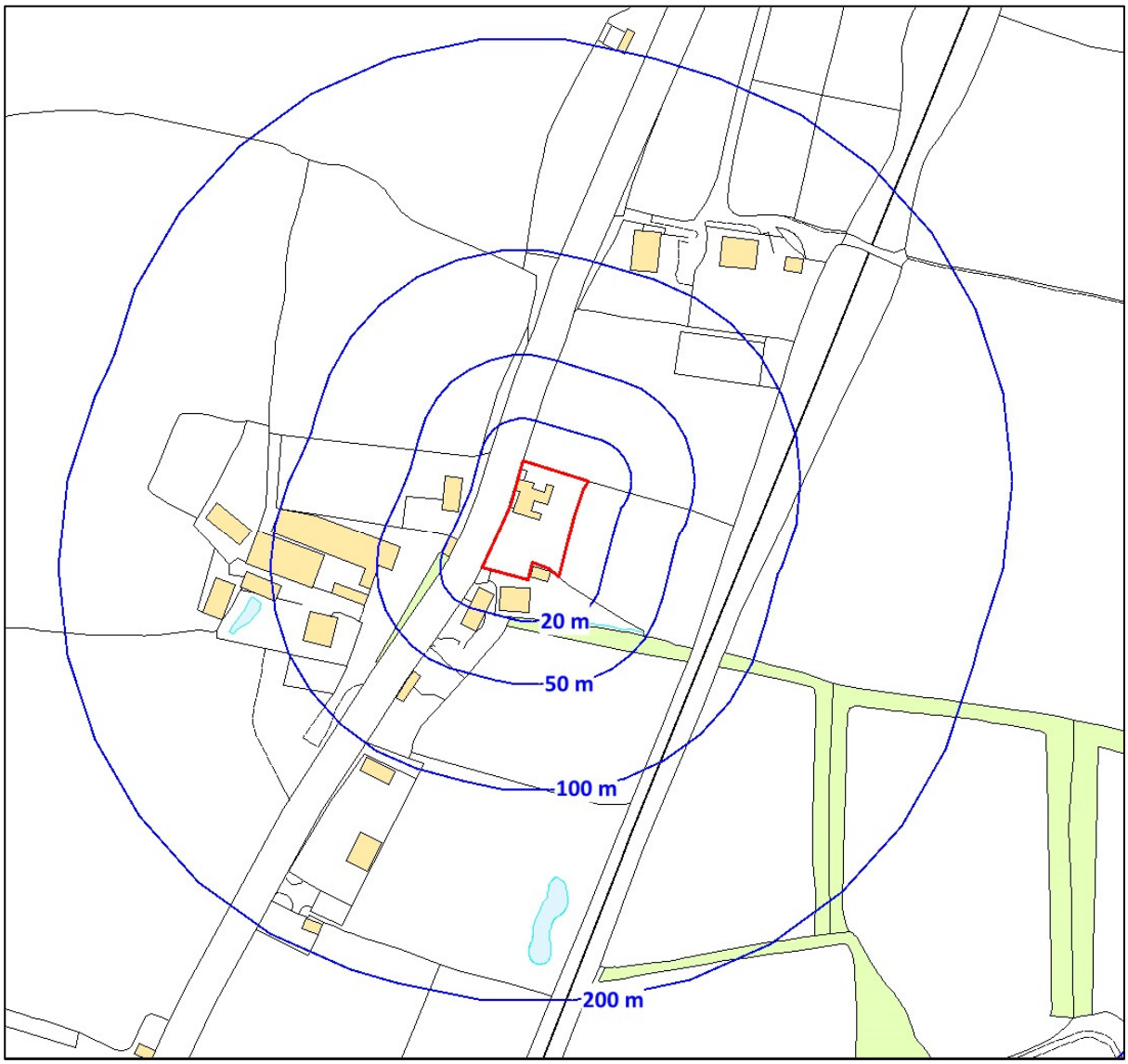
The dust emission magnitudes and sensitivity of the surrounding area are combined to determine the risk of dust impacts with no mitigation applied. These are summarised in Table 7.

Table 7 – Summary of Dust Risk

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Track out
Dust Soiling	N/A	Low Risk	Low Risk	Negligible
Human Health	N/A	Negligible	Negligible	Negligible

It should also be noted that the likelihood of an adverse impact occurring is correlated to wind speed and wind direction. As such, unfavourable wind speeds and wind directions must occur at the same time as a dust generating activity to generate an adverse impact. The overall impacts also assume that the dust generating activities are occurring over the entirety of the site meaning that as an activity moves further away from a potential receptor the magnitude and significance of the impact will be further reduced.

Figure 2 – Distance from the Proposed Development



4 Mitigation Measures

4.1 Construction Phase

A qualitative assessment of dust levels associated with the proposed development has been carried out. The impact of dust soiling and PM_{10} can be reduced to negligible through appropriate mitigation measures, which are listed in Table 8 and are applicable to a low-risk site. Implementation of these Best Practice Measures will help reduce the impact of the construction activities.

With these mitigation measures enforced, the likelihood of nuisance dust episodes occurring at those receptors adjacent to the development are considered low. Notwithstanding this, the developer should take into account the potential impact of air quality and dust on occupational exposure standards (in order to minimise worker exposure) and breaches of air quality objectives that may occur outside the site boundary. Monitoring is not recommended at this stage, however, continuous visual assessment of the site should be undertaken and a complaints log maintained in order to determine the origin of a particular dust nuisance. Keeping an accurate and up to date complaints log will isolate particular site activities to a nuisance dust episode and help prevent it from reoccurring in the future.

4.2 Operational Phase

The "*Air quality and emissions mitigation guidance for Sussex (2021)*" states that the following mitigation measures are required for all developments:

- all gas-fired boilers to meet a minimum standard of <40mgNOx/kWh. Consideration should be given to renewable sources of energy, e.g. air source heat pumps, as an alternative.

- meet the electric vehicle charging point guidance set out with the West Sussex County Council "*Guidance on Parking at New Developments (September 2020)*", which states that "Active" charging points for electric vehicles should be provided at a minimum of 20% of all parking spaces with ducting provided at all remaining spaces where appropriate to provide "passive" provision for these spaces to be upgraded in future.

In accordance with this guidance the developer will be installing an active electric vehicle charging points (EVCP) at four of the eight parking spaces proposed.

Currently, no decision has been made on the provision of heating and hot water. However, it is likely that electric boilers or heat pumps will be used.

Table 8 – Mitigation of Construction Activities

Construction Activity	Mitigation Measures
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 environment manager/engineer or the site manager.
	Display the head or regional office contact information.
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 a complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.
Monitoring	Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.
Preparing and maintaining the site	Plan site layout: machinery and dust causing activities should be located away from receptors.
	Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.
	Avoid site runoff of water or mud.
Operating vehicle/machinery	Ensure all non-road mobile machinery (NRMM) comply with relevant standards.
	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 possible.
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 mitigation (using recycled water where possible).
	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.
Waste Management	Reuse and recycle waste to reduce dust from waste materials
	Avoid bonfires and burning of waste materials.