



Air Quality Assessment	
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1 Introduction

1.1. Proposed Development

- 1.1.1 Air Quality Assessments Ltd (AQA) has been commissioned by Forma Property to undertake an air quality assessment for the proposed redevelopment of an office building to 11 residential units at 7 Wrotham Road, Gravesend, DA11 0PD. The application site location is shown in **Figure 1** on **Page 12**.
- 1.1.2 The application site lies adjacent to an Air Quality Management Area (AQMA) declared by Gravesham Borough Council for exceedances of the annual mean nitrogen dioxide (NO₂) air quality objective.

1.2. Scope of Assessment

- 1.2.1 This report describes the existing air quality conditions in proximity to the site and considers the effect of the development on local air quality and the effect of existing air quality on the development itself. The main air pollutants of concern related to the health effects of road traffic emissions are NO₂ and fine particulate matter (PM₁₀ and PM_{2.5}).
- 1.2.2 There is also the potential for the construction works to impact upon existing properties. The main pollutants of concern related to construction activities are dust and PM₁₀.
- 1.2.3 The assessment has been prepared taking into account all relevant local and national guidance and regulations.

2 Air Quality Legislation and Policy

2.1. Air Quality Legislation

- 2.1.1 The Air Quality Standards Regulations 2010 (as amended) set legally binding limit values for concentrations of major air pollutants in outdoor air that impact public health, including NO₂, PM₁₀ and PM_{2.5} (The Stationary Office, 2010). Limit values apply at all locations, apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway. The limit values for PM₁₀ and NO₂ applied from 2005 and 2010 respectively, whereas the PM_{2.5} limit value applied from 2020.
- 2.1.2 Part IV of The Environment Act 1995, as amended by the Environment Act 2021, requires the UK Government to prepare a national Air Quality Strategy. A new Air Quality Strategy for England was published in April 2023 (Defra, 2023a). The Air Quality Strategy sets out the actions that Defra expects local authorities to take in support of long-term air quality goals, including new PM_{2.5} targets, and provides a framework to enable local authorities to make the best use of their powers and make improvements for their communities.
- 2.1.3 The strategy sets out air quality standards and objectives intended to protect human health and the environment. Standards are the concentrations of pollutants in the atmosphere, below which there is a minimum risk of health effects or ecosystem damage; they are set with regard to scientific and medical evidence. Objectives are the policy targets set by the Government, taking account of economic efficiency, practicability, technical feasibility and timescale, where the standards are expected to be achieved by a certain date. The Government has also published a Clean Air Strategy, which provides an overview of the actions that the government will take to improve air quality (Defra, 2019). The actions in the Clean Air Strategy focus on emissions from transport, the home, farming, and industry.
- 2.1.4 The Air Quality Strategy also describes the system of Local Air Quality Management (LAQM), which was introduced in Part IV of the Environment Act 1995. LAQM requires every local authority to carry out regular review and assessments of air quality in its area. Where an objective has not been, or is unlikely to be achieved, the local authority must declare an Air Quality Management Area (AQMA) and prepare an action plan which sets out appropriate measures to be introduced in pursuit of the objectives. PM_{2.5} is not included in the LAQM framework; however, the government expects all local authorities to effectively use their powers to reduce PM_{2.5} emissions from the sources which are within their control.
- 2.1.5 The objectives for NO₂ and PM₁₀, as prescribed by the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002, are shown in **Table 1** (The Stationary Office, 2000; The Stationary Office, 2002). The objectives for NO₂ and PM₁₀ are the same as the limit values, but with differing compliance dates. The objectives for PM₁₀ and NO₂ were to have been achieved by 2004 and 2005 respectively and continue to apply in all future years thereafter.
- 2.1.6 The air quality limit value for PM_{2.5} is also shown in **Table 1**. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 set out two legally

binding targets for PM_{2.5}, with interim targets for each set out in the Environmental Improvement Plan 2023 (The Stationery Office, 2023; Defra, 2023b). The PM_{2.5} targets are:

- 10µg/m³ annual mean concentration PM_{2.5} nationwide by 2040, with an interim target of 12µg/m³ by January 2028; and
- 35% reduction in average population exposure by 2040, with an interim target of a 22% reduction by January 2028, both compared to a 2018 baseline.

Table 1: The Objectives for NO_x, NO₂ and PM₁₀ and the PM_{2.5} Limit Value

Pollutant	Concentration Measured As	Objective/Limit Value
NO ₂	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
PM _{2.5}	Annual Mean	20 µg/m ³

2.1.7 The objectives for human health apply at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. Examples of where the objectives should apply are provided in the Local Air Quality Management Technical Guidance (Defra, 2022) issued by the Department for Environment, Food and Rural Affairs (Defra). The annual mean NO₂ and PM₁₀ objectives should apply at the building façades of residential properties, schools, hospitals, care homes etc.; they should not apply at the building façades of places of work, hotels, gardens or kerbside sites. The 24-hour mean PM₁₀ objective should apply at all locations where the annual mean objective applies, as well as the gardens of residential properties and hotels. The 1-hour mean NO₂ objective should apply at all locations where the annual and 24-hour mean objectives apply, as well as at kerbside sites where the public have regular access, e.g., the pavements of busy shopping streets.

2.2. Planning Policy

National Policies and Guidance

2.2.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied (Department for Levelling Up, Housing and Communities, 2023). It provides a framework within which locally prepared plans for development can be produced. At Paragraph 8c, the NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development and includes an overarching 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.”

- 2.2.2 With regard to environmental impacts from traffic, at Paragraph 104 the NPPF states that:

“Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: ...

d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; ...”

- 2.2.3 The NPPF also states at Paragraph 174 that:

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

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

- 2.2.4 The NPPF goes on to state at Paragraph 185:

“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.”

- 2.2.5 With specific reference to air quality, the NPPF states at Paragraph 186 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.”

- 2.2.6 The NPPF also includes the following statement at Paragraph 188:

“The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues

should not be revisited through the permitting regimes operated by pollution control authorities."

- 2.2.7 The NPPG is supported by Air Quality national Planning Practice Guidance (nPPG) (Department for Levelling Up, Housing and Communities, 2019). The nPPG states that:

"The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant 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."

- 2.2.8 The nPPG goes on to state 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."

- 2.2.9 The nPPG also sets out the information that may be required in an air quality assessment, stating 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."

- 2.2.10 It also provides guidance on options for mitigating air quality impacts, and 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."

- 2.2.11 The nPPG makes clear that:

"... dust can also be a planning concern, for example, because of the effect on local amenity."

Local Policies

- 2.2.12 The Gravesham Local Plan Core Strategy includes Policy CS19: Development and Design Principles, the relevant parts of which state (Gravesham Borough Council, 2014):

"New development will be visually attractive, fit for purpose and locally distinctive. It will conserve and enhance the character of the local built, historic and natural environment, integrate well with the surrounding local area and meet anti-crime standards. The design and construction of new development will incorporate sustainable construction standards and techniques, be adaptable to reflect changing

lifestyles, and be resilient to the effects of climate change. This will be achieved through the criteria set out below: ...

New development will be located, designed and constructed to:

- *safeguard the amenity, including privacy, daylight and sunlight, of its occupants and those of neighbouring properties and land;*
- *avoid adverse environmental impacts from pollution, including noise, air, odour and light pollution, and land contamination; and ...”*

2.2.13 Gravesham Borough Council has produced an Air Quality Action Plan for the AQMA adjacent to the application site, which sets out the measures that the council will take to improve air quality within the AQMA (Gravesham Borough Council, 2006a). Gravesham Borough Council has also produced an Air Quality Strategy which aims to improve air quality across the entire borough (Gravesham Borough Council, 2006b).

3 Methodology

3.1. Existing Conditions

3.1.1 Information on existing air quality within the study area has been collated from the following sources:

- The results of monitoring and the most recent publicly available LAQM Air Quality Annual Status Report published by Gravesham Borough Council (Gravesham Borough Council, 2023);
- Background pollutant concentration maps published by Defra (Defra, 2023c).

3.2. Construction Impacts

3.2.1 A construction dust risk assessment has been undertaken following the methodology in the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2023).

3.2.2 The guidance divides activities on construction sites into four main types: demolition, earthworks, construction and trackout. The methodology is based on a sequence of steps. Step 1 screens the requirement for more detailed assessment; if there are no receptors within 250 m of the site boundary, or within 50 m of roads used by construction vehicles up to 250m from the site entrance, then there is no need for further assessment. Step 2 assesses the risk of dust impacts from each of the four activities, considering the scale and magnitude of the works (Step 2A), and the sensitivity of the area (Step 2B), which are combined at Step 2C to give the risk of dust impacts. Step 3 is to determine site-specific mitigation for each of the four activities based on the dust risk category defined at Step 2C. **Appendix A1** sets out the construction dust assessment methodology in more detail.

3.2.3 The IAQM construction dust assessment methodology ensures that, with appropriate mitigation in place, the residual effect from construction dust will normally be 'not significant'. Therefore, the assessment has been used to determine an appropriate level of mitigation for the construction phase.

3.3. Road Traffic Impacts

3.3.1 Guidance for air quality and planning officers within local authorities, and developers and consultants involved in air quality assessments, has been published by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) in Land-Use Planning & Development Control: Planning for Air Quality (EPUK and IAQM, 2017). . The guidance sets out criteria to help establish when an air quality assessment is likely to be considered necessary.

3.3.2 For impacts of existing air quality on new development, the requirement for an assessment should be based on professional judgement, taking 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 NO₂), 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.

3.3.3 For impacts of development on the local area, a two-stage approach is suggested, with the first stage intended to screen out small developments, and developments considered likely to have insignificant air quality effects. The full criteria are shown in **Appendix A2**. The EPUK/IAQM guidance is clear that:

“If none of the criteria are met, then there should be no requirement to carry out an air quality assessment for the impact of the development on the local area, and the impacts can be considered as having an insignificant effect.”

3.3.4 A qualitative assessment of the air quality impacts associated with the development has been undertaken based on the scale of the development, the distance of the development from emissions sources and the existing air quality. The criteria in the EPUK/IAQM guidance and professional judgement have been used to screen the requirement for a full air quality assessment, with the professional experience of the consultant preparing this report set out in **Appendix A3**.

4 Baseline Conditions

4.1. LAQM Review and Assessment

- 4.1.1 Gravesham Borough Council has declared four AQMAs, one of which covers the A226 one way system in Gravesend. The Gravesend AQMA has been declared for exceedances of the annual mean NO₂ objective and the front façade of the proposed development is within 5m of the AQMA.

4.2. Local Air Quality Monitoring

- 4.2.1 Gravesham Borough Council currently operates two automatic monitoring sites and an NO₂ diffusion tube monitoring network. Data from the automatic monitoring sites and diffusion tube monitoring sites located within 200m of the application site are shown in **Table 2** and **Table 3**, with the monitoring locations shown in **Figure 1**. No monitoring of PM_{2.5} is undertaken by Gravesham Borough Council.
- 4.2.2 Annual mean NO₂ concentrations at diffusion tube monitoring sites within 200m of the application site ranged from 21.8 to 53.4µg/m³ between 2018 and 2022. Exceedances of the annual mean NO₂ objective have been measured at diffusion tube monitoring sites GR119 and GR135; however, there is an overall decreasing trend in annual mean NO₂ concentrations, and in 2022 no exceedances were measured at any location, with concentrations ranging from 21.8 to 39.4µg/m³. Low concentrations measured in 2020 and 2021 were likely due to lower emissions because of travel restrictions during the COVID-19 pandemic; however, annual mean NO₂ concentrations remained low in 2022 when there were no travel restrictions.
- 4.2.3 Diffusion tube monitoring is undertaken at two locations within, or immediately adjacent to the application site, at monitoring sites GR130 and GR131. Annual mean NO₂ concentrations at these locations ranged from 21.8 to 31.3µg/m³ between 2018 and 2022; therefore, the objective has been achieved at the application site.
- 4.2.4 Measurements across the UK have shown that there is a risk of exceedances of the 1-hour NO₂ objective where the annual mean concentration is above 60 µg/m³; however, this value has not been exceeded at any of the diffusion tube monitoring sites. No exceedances of the 200 µg/m³ 1-hour mean NO₂ objective level have been measured at the ZG2 or ZG3 automatic monitoring sites between 2018 and 2022.
- 4.2.5 No exceedances of the objectives for PM₁₀ have been measured at the automatic monitoring sites.

4.3. Background Concentrations

- 4.3.1 Estimated background concentrations at the application site are shown in **Table 4**. The background concentrations have been derived from data in the national maps published by Defra. The background concentrations are well below the objectives.

Table 2: Measured Annual Mean NO₂ Concentrations

Site ID	Location	Site Type ^b	Annual Mean (µg/m³) ^a				
			2018	2019	2020	2021	2022
Automatic Monitor							
ZG2	Gravesham A2 Roadside	R	29.9	29.1	23.7	22.8	22.2
ZG3	Gravesham Industrial Background	I	23.5	24.5	22.0	21.0	18.2
Diffusion Tube							
GR39	19 Stone Street	R	35.8	35	28.3	31.0	29.3
GR118	40 Windmill Street	R	34.8	34.9	29	30.9	30.3
GR119	Woodville Place	R	53.4	49.5	37.6	41.7	39.4
GR122	King & Taylor 10-12 Wrotham Road	R	36.1	37	30.7	32.6	31.4
GR125	170 Parrack Street	R	32.1	33.2	27.5	29.6	28.3
GR127	17 Darnley Road	R	30.1	30.4	24.9	26.6	24.0
GR128	1a Railway Place	R	30.9	31.8	26	29.6	26.0
GR129	20 Stone Street	R	27.8	28.4	24.7	25.0	23.4
GR130	6 Wrotham Road, The Hair Shop	R	30.6	31.3	26	27.0	25.7
GR131	7 Wrotham Road, Martin Tolhurst Solicitors	R	24.9	26.4	22.5	22.1	21.8
GR133	23 Wrotham Road	R	36.3	36.2	28.7	28.3	27.5
GR134	17 Wrotham Road	R	32.8	33.7	24.9	25.2	27.6
GR135	25 Wrotham Road	R	44.8	43.9	36.8	35.7	31.1
GR136	Woodville Place, opposite 17 Wrotham Road	R	39.3	37.4	32.3	31.1	30.1
GR143	29 Wrotham Road	R	36.6	37	29.5	29.0	28.2
Objective			40				

a Exceedances are shown in bold.

b R = Roadside, I = Industrial.

Table 3: Summary of PM₁₀ Monitoring Data

Site ID	Location	Site Type ^a	2018	2019	2020	2021	2022
Annual Mean (µg/m³)							
ZG2	Gravesham A2 Roadside	R	15.4	15.3	16.3	16.0	15.3
ZG3	Gravesham Industrial Background	I	21.9	22.3	21.3	20.6	22.5
Objective			40				
Number of Days > 50 µg/m³							
ZG2	Gravesham A2 Roadside	R	1	1	1	0	0
ZG3	Gravesham Industrial Background	I	3	10	8	1	0
Objective			35				

a R = Roadside, I = Industrial.

Table 4: Estimated Annual Mean Background Concentrations in 2023 (µg/m³)

OS Grid (x,y)	NO ₂	PM ₁₀	PM _{2.5}
564500,173500	18.1	16.5	11.4
Objective/Limit Value	40	40	20

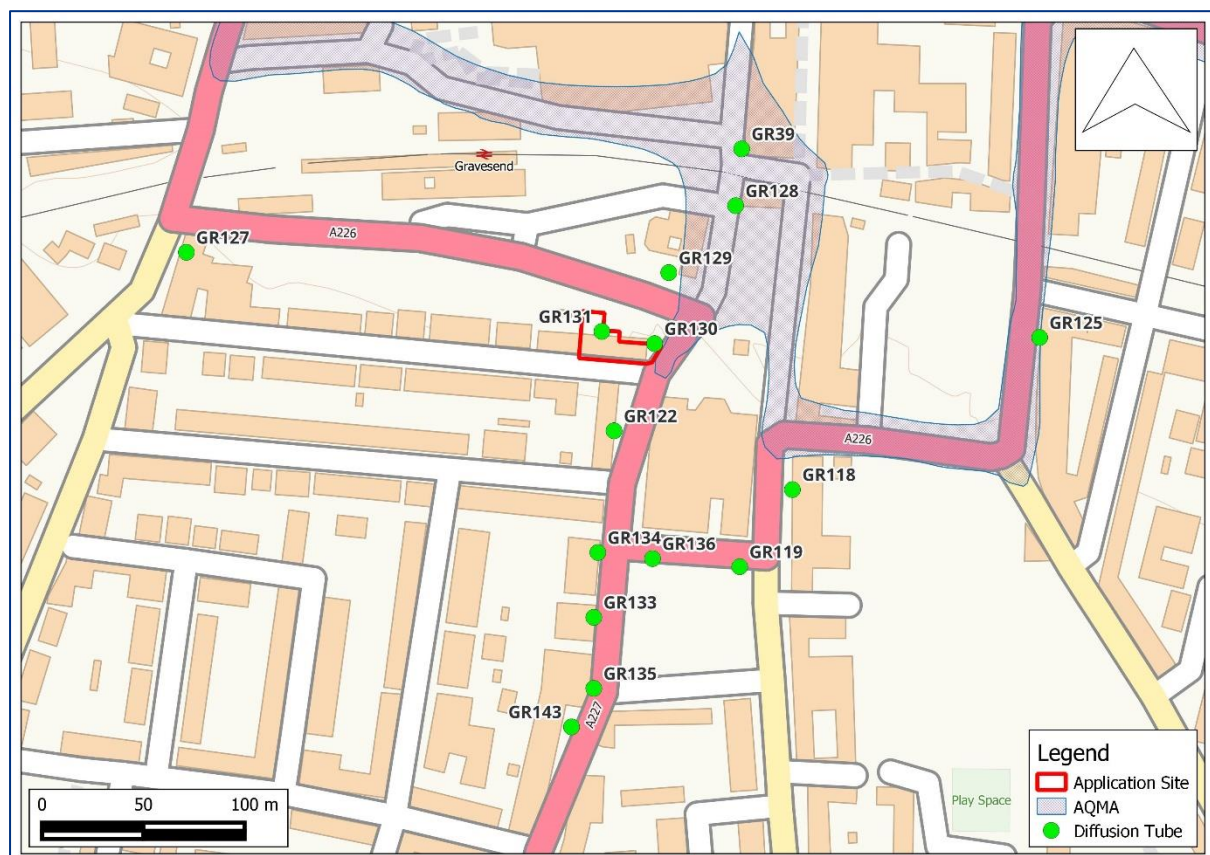
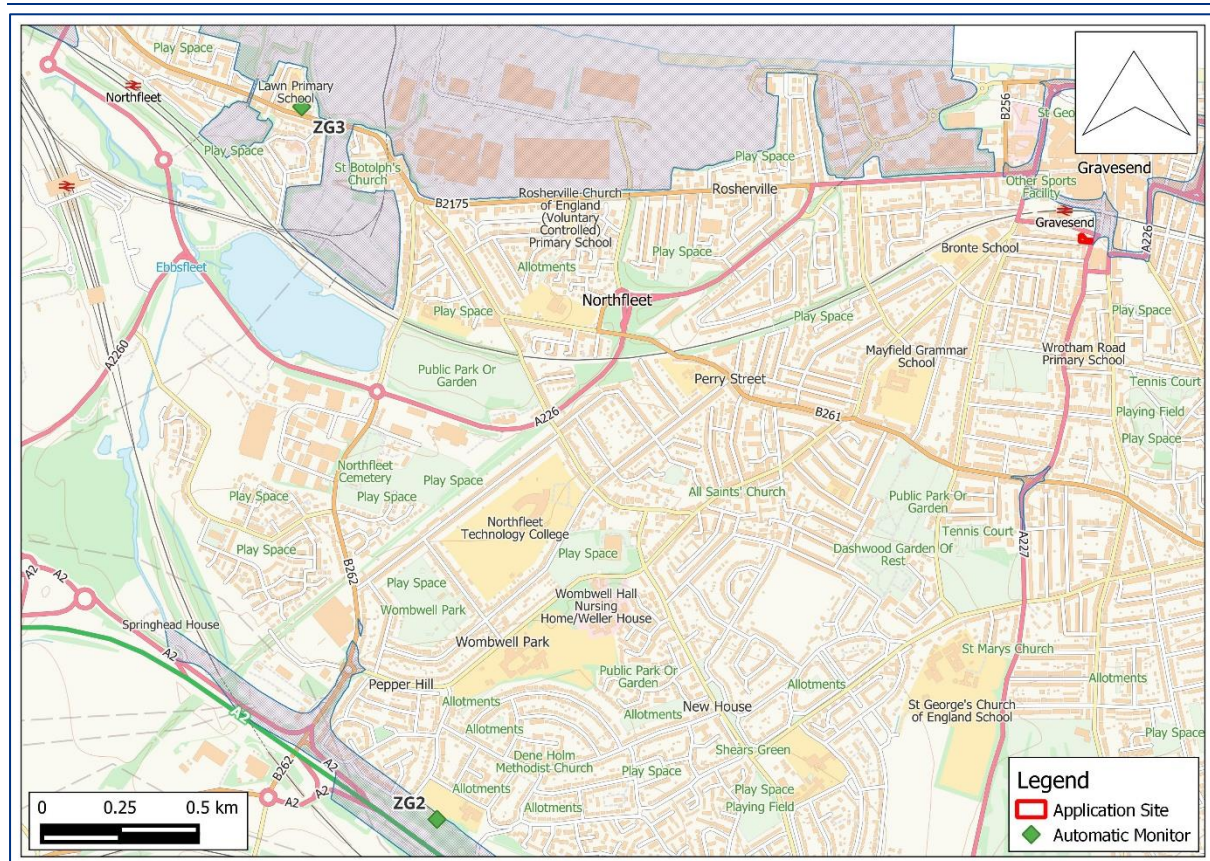


Figure 1: Application Site, AQMAs and Air Quality Monitoring Sites
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5 Air Quality Assessment

5.1. Construction Phase

- 5.1.1 Without mitigation, there is a risk that the construction phase of the development will lead to dust soiling and elevated concentrations of PM₁₀. These impacts may occur during demolition, earthworks and construction, as well as from track-out of dust onto the public highway, as vehicles leave the construction site.

Screening

- 5.1.2 There are human receptors within 250m of construction activities and further assessment of the construction phase impacts on human receptors is necessary. There are no sensitive ecological receptors within 50m of the application site boundary, and the effects of construction on ecology will not be considered further.

Risk of Dust Impacts

Potential Dust Emission Magnitude

- 5.1.3 The existing structures will be refurbished and no demolition will be undertaken; therefore, dust emissions due to demolition have not been considered any further.
- 5.1.4 There will be no earthworks; therefore, dust emissions due to earthworks have not been considered any further.
- 5.1.5 The refurbishment of the building may lead to some dust emissions; however, given that the existing building will be retained, the dust emission class for construction is considered to be small.
- 5.1.6 Heavy duty vehicles (HDV) servicing the works will remain on tarmacked roads and there will be no trackout of materials from the site.
- 5.1.7 A summary of the likely dust emission magnitudes is shown in **Table 5**.

Table 5: Likely Dust Emission Magnitudes

Source	Dust Emission Magnitude
Demolition	n/a
Earthworks	n/a
Construction	Small
Trackout	n/a

Sensitivity of the Area

- 5.1.8 The sensitivity of the area depends on the specific sensitivities of local receptors, the proximity and number of receptors, local PM₁₀ background concentrations and other site-specific factors, e.g. natural screening by trees.

Sensitivity of the Area to Dust Soiling

- 5.1.9 The nearby residential properties are considered to be 'high' sensitivity receptors to dust soiling (see **Table A2** of **Appendix A1**).
- 5.1.10 There will be less than 10 high sensitivity dust receptors within 20m of dust generating activities during the construction works; therefore, with reference to **Table A5** of **Appendix A1**, the area is considered to be of medium sensitivity to dust soiling during the construction works.

Sensitivity of the Area to the Health Effects of PM₁₀

- 5.1.11 The nearby residential properties are considered to be 'high' sensitivity receptors to the health effects of PM₁₀ (see **Table A3** of **Appendix A1**).
- 5.1.12 The application site and surrounding area are unlikely to be exposed to annual mean PM₁₀ concentrations higher than those measured at the Gravesham automatic monitoring sites, i.e., between 15.3-22.5µg/m³. Therefore, with reference to **Table A6** of **Appendix A1**, the area is considered to be of low sensitivity to the health effects of PM₁₀ during on-site works.
- 5.1.13 A summary of the sensitivity of the area to the effects of the construction works is shown in **Table 6**.

Table 6: Summary of the Area Sensitivity

Potential Effect	Sensitivity of the Area	
	Construction	Trackout
Dust Soiling	Medium	n/a
Health	Low	n/a

Risk of Impact and Significance

- 5.1.14 The dust emission magnitudes in **Table 5** have been combined with the area sensitivities in **Table 6** and a risk category has been assigned to each construction activity using the matrix in **Table A8** of **Appendix A1**. The resultant risk categories, shown in **Table 7**, have then been used to determine the appropriate level of mitigation necessary for a residual effect that is likely to be 'not significant'.

Table 7: Summary of the Risk of Impacts Without Mitigation

Construction Activity	Dust Soiling	Health
Demolition	n/a	n/a
Earthworks	n/a	n/a
Construction	Low	Negligible
Trackout	n/a	n/a

5.2. Operational Phase

Impact of the Development

- 5.2.1 No additional parking will be provided by the proposed development and the proposed development will not increase traffic on local roads.
- 5.2.2 With regard to the IAQM screening criteria in **Appendix A2**, detailed assessment of the air quality impacts of the development on the surrounding area should not be required and the air quality effects are considered to be insignificant.

Impact on the Development

- 5.2.3 Annual mean NO₂ concentrations at the application site have been measured by Gravesham Borough Council as part of its LAQM obligations. Annual mean NO₂ concentrations at the application site ranged from 21.8 to 31.3µg/m³ between 2018 and 2022, and in 2022 ranged from 21.8 to 25.7µg/m³; therefore, the objective has been achieved by a wide margin at the application site. Given the decreasing trend in concentrations, air quality is likely to further improve in the future.
- 5.2.4 Gravesham Borough Council has concluded that concentrations of PM₁₀ do not exceed the objectives in the vicinity of the application site.
- 5.2.5 Pollutant concentrations at the application site would be well below the air quality objectives. Therefore, air quality at the proposed development would be acceptable and the impact of existing air quality on the proposed development would be insignificant.

6 Mitigation

6.1. Construction Phase

- 6.1.1 The application site has been identified as a low-risk site for dust soiling and a negligible risk site for health effects during the construction phase, as set out in **Table 7**. The dust risk category has been used, along with the professional judgement of the consultant, to determine the appropriate level of mitigation at the site. The mitigation measures, taken from the IAQM guidance, are described in **Appendix A4**.
- 6.1.2 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'.

6.2. Operational Phase

- 6.2.1 The screening assessment has shown that the proposed development would not have a significant effect on local air quality and that air quality at the proposed development would be suitable for residential use.
- 6.2.2 Measures to reduce pollutant emissions from road traffic are being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation; therefore, it is not considered appropriate to propose further mitigation measures for this scheme.

7 Conclusions

- 7.1.1 The air quality impacts due to the construction and operation of the proposed development have been assessed.
- 7.1.2 The construction phase will have the potential to create dust. It will therefore be necessary to implement mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be insignificant.
- 7.1.3 The development will not increase traffic above the level of the IAQM/EPUK screening criteria during the operational phase; therefore, detailed air quality assessment should not be necessary, and the development will have an insignificant effect on local air quality due to vehicle emissions.
- 7.1.4 Pollutant concentrations at the application site are well below the air quality objectives and air quality will be acceptable for residential development.
- 7.1.5 The air quality effects of the proposed development have been assessed and found to be insignificant. There should be no constraints to the development of the site for residential use, with regard to air quality, as the development is consistent with the relevant parts of:
 - the NPPF and Air Quality nPPG;
 - Policy CS19 of the Gravesham Local Plan Core Strategy.

8 References

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A1 Construction Dust Assessment Methodology

A1.1.1 The IAQM guidance divides activities on construction sites into four types to reflect their different potential impacts:

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

A1.1.2 A series of steps then consider the potential impact due to:

- annoyance due to dust soiling;
- the risk of health effects due to increased exposure to PM₁₀; and
- harm to ecological receptors.

A1.2. Step 1: Screen the Need for a Detailed Assessment

A1.2.1 An assessment is required where there is a human receptor within 250 m of the site boundary, and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s), or where there is an ecological receptor within 50 m of the site boundary, and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

A1.2.2 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is negligible, and any effects will be not significant.

A1.3. Step 2: Assess the Risk of Dust Impacts

A1.3.1 A site is allocated to a risk category based on two factors:

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

A1.3.2 These two factors are combined at Step 2C to determine the risk of dust impacts from each type of construction activity, with no mitigation applied.

Step 2A: Potential Dust Emissions Magnitude

A1.3.3 The dust emission magnitude is classified as small, medium or large. Examples of how the potential dust emission magnitude for each activity can be defined are shown in **Table A1**.

Table A1: Examples of How the Dust Emission Magnitude can be Defined

Class	Example
Demolition	
Large	Total building volume >75,000m ³ , potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >12m above ground level.
Medium	Total building volume 12,000m ³ – 75,000m ³ , potentially dusty construction material, demolition activities 6-12m above ground level.
Small	Total building volume <12,000m 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	
Large	Total site area >110,000m 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 >6m in height.
Medium	Total site area 18,000m ² – 110,000m 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.
Small	Total site area <18,000m ² , 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.
Construction	
Large	Total building volume >75,000m ³ , on site concrete batching; sandblasting.
Medium	Total building volume 12,000m ³ – 75,000m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching.
Small	Total building volume <12,000m 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 >100m.
Medium	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m.
Small	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

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

Step 2B: Define the Sensitivity of the Area

A1.3.4 The sensitivity of the area takes account of:

- the specific sensitivities of receptors in the area;

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

A1.3.5 The specific sensitivities of different types of receptor to dust soiling and PM₁₀ are shown **Table A2**, **Table A3** and **Table A4**. Professional judgement should be used to identify where on the spectrum of sensitivity a receptor lies, taking account of specific circumstances, i.e. the first occupants of residential units on a phased development may be expected to be less sensitive to dust soiling.

A1.3.6 The sensitivity of the area is then determined from the specific sensitivities of the receptors using the matrices set out in **Table A5**, **Table A6** and

A1.3.7 Table A7.

A1.3.8 Professional judgement should be used to determine the final sensitivity of the area, taking account of:

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

Step 2C: Define the Risk of Impacts

A1.3.9 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 level of risk for each activity is determined using the matrix in **Table A8**.

A1.4. Step 3: Determine Site Specific Mitigation

A1.4.1 The dust risk category determined at Step 2C has been used, along with the professional judgement of the consultant, to determine the appropriate level of mitigation at the site. The highly recommended and desirable mitigation measures set out in the IAQM guidance form the basis of the mitigation set out in **Appendix A4**.

A1.5. Step 4: Determine Significant Effects

A1.5.1 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'.

Table A2: Sensitivities of People to Dust Soiling Effects

Class	Principles	Examples
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, museums 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 property 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.

Table A3: Sensitivities of People to the Health Effects of PM₁₀

Class	Principles	Examples
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.	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.

Table A4: Sensitivities of Receptors to Ecological Effects

Class	Principles	Examples
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 such as vascular species included in the Red Data List For Great Britain.	Special Areas of Conservation (SAC) designated for acid heathlands or local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
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 (SSSI) 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 A5: Sensitivity of the Area to Dust Soiling Effects on People and Property ¹

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

¹ For demolition, earthworks and construction, the distances are measured from the dust source, or the application site boundary. For trackout, the distances are measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500m from large sites, 200m from medium sites and 50m from small sites, 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 50m from the edge of the road.

Table A6: Sensitivity of the Area to Human Health Effects ¹

Receptor Sensitivity	Annual Mean PM ₁₀	Number of Receptors	Distance 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
	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
	<24µg/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
	28-32 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
	<24µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table A7: Sensitivity of the Area to Ecological Effects ¹

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

Table A8: 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 IAQM Criteria Used to Establish when an Air Quality Assessment is Likely to be Necessary

A1.2.1 Stage 1 (criteria to proceed to Stage 2).

A. If any of the following apply:

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

B. Coupled with any of the following:

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

Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

A1.2.2 The Stage 2 criteria are shown in **Table A9**.

Table A9: Indicative Criteria for Requiring an Air Quality Assessment

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment ^a
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA; - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight)	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA; - more than 100 AADT elsewhere.
3. Realign 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.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA; - more than 100 AADT elsewhere.

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment ^a
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor; coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes	Where the combustion unit is: - any centralised plant using bio fuel; - any combustion plant with single or combined thermal input >300kW; - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
8. Have a combustion process of any size	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way of their size and/or height.

a AADT = Annual Average Daily Traffic

A3 Professional Experience

Bob Thomas, BSc (Hons) PgDip MSc MEnvSc MIAQM CSci

Bob Thomas is a Director at AQA, with over twenty years working in the sciences and sixteen years' experience in the field of air quality management and assessment. He has carried out air quality assessments for a wide range of developments, including residential, commercial, industrial, minerals and waste developments. He has been responsible for air quality projects that include ambient air quality monitoring of nitrogen dioxide, dust and PM₁₀, the assessment of nuisance odours and dust, and the preparation of Review and Assessment reports for local authorities. He has extensive dispersion modelling experience for road traffic, energy centre and industrial sources, and has completed many stand-alone reports and chapters for inclusion within an Environmental Statement. Bob has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers, architects and process operators, and has provided expert witness services at public inquiry. He is a Chartered Scientist, a Member of the Institute of Air Quality Management and a Member of the Institution of Environmental Sciences.

A full CV for Bob Thomas is available at <http://aqassessments.co.uk/about>

A4 Construction Mitigation

A4.1.1 The following is a set of measures that should be incorporated into the specification for the works.

A4.2. 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; and
- display the head or regional office contact information.

A4.3. 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; and
- 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.

A4.4. Monitoring

- Undertake daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary, with cleaning to be provided if necessary;
- carry out regular site inspections, record inspection results, and make an inspection log available to the Local Authority when asked; and
- 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 area being carried out and during prolonged dry or windy conditions.

A4.5. Preparing and Maintaining the Site

- keep site fencing, barriers and scaffolding clean using wet methods.

A4.6. Operating Vehicle/Machinery and Sustainable Travel

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

A4.7. 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; and
 - 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; and
 - 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.

A4.8. Waste Management

- Avoid bonfires and burning of waste materials.

A4.9. Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces), if possible; and
- 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.