

Air Quality Assessment

Lee Lane, Royston

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1.0 INTRODUCTION

1.1 Background

- 1.1.1 Redmore Environmental Ltd was commissioned by Johnson Mowat Planning Ltd to produce an Air Quality Assessment in support of a residential development on land off Lee Lane, Royston.
- 1.1.2 The development has the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future residents to any existing air quality issues. As such, an Air Quality Assessment was required in order to consider potential effects associated with the scheme and identify appropriate control measures for inclusion in the proposals.

1.2 Site Location and Context

- 1.2.1 The site is located on land off Lee Lane, Royston, at approximate National Grid Reference (NGR): 435012, 411290.
- 1.2.2 The proposals comprise the construction of circa 100 residential dwellings and associated infrastructure.
- 1.2.3 Subsequent to submission of the planning application for the development, Barnsley Metropolitan Borough Council (BMBC) requested¹ an Air Quality Assessment was undertaken in support of the proposals in accordance with BMBC's 'Air Quality and Emissions Good Practice Planning Guidance'². This is detailed in the following report.

¹ Email Correspondence, Validation Officer at BMBC, 2020.

² Air Quality and Emission Good Practice Planning Guidance, BMBC, 2020.

2.0 **AIR QUALITY PLANNING GUIDANCE**

2.1 **Introduction**

2.1.1 The Air Quality and Emissions Good Practice Planning Guidance³ has been developed by the West Yorkshire Low Emissions Group in response to the changes in national planning policy through the National Planning Policy Framework (NPPF). The document aims to:

- Introduce a method for assessing the air quality impacts of a development which includes the quantification of impacts, calculation of damage costs and the identification of mitigation measures to be implemented to negate the impact of development on air quality;
- Tackle cumulative impacts; and,
- Provide clarity and consistency of the process for developers, the local planning authority and local communities.

2.1.2 The guidance provides a staged approach to ensure all air quality issues relevant to a particular development are addressed in a standardised manner. These have been completed for the proposals in the following Sections.

2.2 **Stage 1: Development Type Classification**

2.2.1 The purpose of Stage 1 is to determine the scale of a development. The appropriate development classification is identified using criteria adapted from the Department for Transport (DfT)⁴. Criteria relevant to the proposed development is shown in Table 1.

Table 1 Stage 1: Criteria for Development Classification

Land Use	Description	Transport Assessment Required
Dwelling Houses (C3)	Dwellings for individuals, families or not more than six people in a single household	>50 units
Other		

³ Air Quality and Emission Good Practice Planning Guidance, BMBC, 2020.

⁴ Guidance on Transport Assessment - Appendix B: Indicative Threshold for Transport Assessments, DfT, 2007

Land Use	Description	Transport Assessment Required
	1. Any development generating 30 or more two-way vehicle movements in any hour 2. Any development generating 100 or more two-way vehicle movements per day 3. Any development proposing 100 or more parking spaces 4. Any relevant development proposed in a location where the local transport infrastructure is inadequate 5. Any relevant development proposed in a location adjacent to an Air Quality Management Area (AQMA)	

2.2.2 The scale of a development is classified as either **minor**, **medium** or **major** using the following approach:

- **Minor:** Development proposals that fall below the criteria in Table 1;
- **Medium:** Development proposals that meet that criteria in Table 1; and,
- **Major:** Development proposals that meet the criteria in Table 1 and the additional criteria set out in Table 2.

Table 2: Additional Trigger Criteria for Major Developments

Additional Criteria
<ul style="list-style-type: none"> • Where the proposed development falls within the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 and includes air quality and/or transport as a specific likely impact • Proposals located within an AQMA • Proposals that could increase the existing traffic flow on roads >10,000 Annual Average Daily Traffic (AADT) by 5% or more • Proposals that increase traffic by 5% or more on road canyons with an AADT >5,000 • Proposals that could introduce or significantly alter congestion and includes the introduction of substantial road infrastructure changes • Proposals that reduce average speeds by more than 10kph • Proposals that include additional Heavy Goods Vehicle (HGV) movements by more than 10% of total trips. • Where significant demolition works are proposed • Where significant construction works are proposed

2.2.3 Review of the relevant criteria indicated the proposals were classified as **medium** as they include over 50 dwellings but are not predicted to increase the existing traffic flow on roads of more than 10,000 AADT by 5% or trigger any of the other additional criteria identified in Table 2.

2.3 Stage 2: Air Quality Impact Assessment

2.3.1 Developments classified as **minor** or **medium** are not anticipated to result in significant air quality impacts but there is still the potential for these sites to introduce new sensitive receptors to an area of poor air quality.

2.3.2 The proposals are not located adjacent to or within an AQMA or situated within an area identified by the Department of Environment, Food and Rural Affairs (DEFRA) as requiring additional assessment. As such, a quantitative Air Quality Assessment is not required in support of the development and it is considered unlikely that future residents will be exposed to any existing air quality issues.

2.4 Stage 3: Mitigation

2.4.1 The outcome of Stage 2 identifies the level of mitigation required to negate the potential effects upon health and the local environment. As the proposals were classified as **medium**, Type 2 mitigation is required.

2.4.2 The guidance⁵ provides a number of mitigation options that should be considered for inclusion within developments. Those relevant to the proposals include the following:

- Provision of 1 electric vehicle (EV) charging point per residential unit; and,
- Production of a full Travel Plan to encourage the use of non-transport modes and assist with the reduction of development transport related emissions.

2.4.3 It is confirmed that the above measures will be incorporated into the scheme in response to the assessment. This will assist with minimising air quality effects as a result of vehicle exhaust emissions. As such, they are considered to comply with the requirements of the BMBC's Air Quality and Emissions Good Practice Planning Guidance⁶.

⁵ Air Quality and Emission Good Practice Planning Guidance, BMBC, 2020.

⁶ Air Quality and Emission Good Practice Planning Guidance, BMBC, 2020.

3.0 FUGITIVE DUST EMISSIONS DURING CONSTRUCTION

3.1 Introduction

3.1.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. As required by the BMBC's Air Quality and Emissions Good Practice Planning Guidance⁷ these have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'⁸ and suitable measures identified to minimise releases.

3.1.2 Activities on the proposed construction site have been divided into three types to reflect their different potential impacts. These are:

- Earthworks;
- Construction; and,
- Trackout.

3.1.3 The potential for dust emissions was assessed for each activity that is likely to take place and considered the following separate dust effects:

- Annoyance due to dust soiling; and,
- The risk of health effects due to a significant increase in exposure to particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀).

3.1.4 The assessment steps are detailed below.

3.2 Step 1

3.2.1 Review of the site location indicated human receptors within 350m of the boundary, as well as within 50m of the construction vehicle access route. As such, the assessment proceeded to Step 2.

⁷ Air Quality and Emission Good Practice Planning Guidance, BMBC, 2020.

⁸ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

3.3 Step 2

3.3.1 The site was allocated a risk category based on two factors:

- The scale and nature of the works, which determined the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which were defined as low, medium or high (Step 2B).

3.3.2 The two factors were combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.3.3 Step 2A defined the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission Criteria

Magnitude	Activity	Criteria
Large	Earthworks	<ul style="list-style-type: none">• Total site area greater than 10,000m²• Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size)• More than 10 heavy earth moving vehicles active at any one time• Formation of bunds greater than 8m in height• More than 100,000 tonnes of material moved
	Construction	<ul style="list-style-type: none">• Total building volume greater than 100,000m³• On site concrete batching• Sandblasting
	Trackout	<ul style="list-style-type: none">• More than 50 Heavy Duty Vehicle (HDV) trips per day• Potentially dusty surface material (e.g. high clay content)• Unpaved road length greater than 100m
Medium	Earthworks	<ul style="list-style-type: none">• Total site area 2,500m² to 10,000m²• Moderately dusty soil type (e.g. silt)• 5 to 10 heavy earth moving vehicles active at any one time• Formation of bunds 4m to 8m in height• Total material moved 20,000 tonnes to 100,000 tonnes

Magnitude	Activity	Criteria
	Construction	<ul style="list-style-type: none"> Total building volume 25,000m³ to 100,000m³ Potentially dusty construction material (e.g. concrete) On site concrete batching
	Trackout	<ul style="list-style-type: none"> 10 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Earthworks	<ul style="list-style-type: none"> Total site area less than 2,500m² Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 4m in height Total material moved less than 20,000 tonnes Earthworks during wetter months
	Construction	<ul style="list-style-type: none"> Total building volume less than 25,000m³ Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	<ul style="list-style-type: none"> Less than 10 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

3.3.4 The site area is greater than 10,000m². Therefore, the magnitude of potential dust emissions from earthworks is **large**.

3.3.5 The total building volume to be constructed is between than 25,000m³ and 100,000m³. Therefore, the magnitude of potential dust emissions from construction is **medium**.

3.3.6 It is anticipated that the unpaved road length will be greater than 100m. Therefore, the magnitude of potential dust emissions from trackout is **large**.

3.3.7 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples
High	<ul style="list-style-type: none"> • Users expect of high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the Air Quality Objective (AQO) for PM₁₀. e.g. residential properties, hospitals, schools and residential care homes
Medium	<ul style="list-style-type: none"> • Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • 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 e.g. parks and places of work
Low	<ul style="list-style-type: none"> • Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks and roads

3.3.8 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties located to the north and east of the site.

3.3.9 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Table 5 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

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

3.3.10 There are between 10 and 100 human receptors within 50m of the development boundary and more than 100 human receptors up to 50m of the vehicle access route within 500m of the site. As such, the area is considered to be of **high** sensitivity to potential dust soiling effects.

3.3.11 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6 Construction Dust - Sensitivity of the Area to Human Health Impacts

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

Receptor Sensitivity	Background Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
		1 - 10	Low	Low	Low	Low	Low
		More than 10	Low	Low	Low	Low	Low
	24 - 28µg/m ³	1 - 10	Low	Low	Low	Low	Low
		More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

3.3.12 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist Local Authorities in their Review and Assessment of air quality. The site is located in grid square NGR: 434500, 411500. Data for this location was downloaded from the DEFRA website⁹ for the purpose of the report and is summarised in Table 7.

Table 7 Background Pollutant Concentration Predictions

Pollutant	Predicted 2020 Background Pollutant Concentration (µg/m ³)
PM ₁₀	10.86

3.3.13 As shown in Table 7, baseline PM₁₀ concentrations fall into the less than 24µg/m³ criteria. There are between 10 and 100 human receptors within 50m of the development boundary and more than 100 human receptors up to 50m of the vehicle access route within 500m of the site. As such, the area is considered to be of **medium** sensitivity to potential human health impacts from trackout and of **low** sensitivity from earthworks and construction.

3.3.14 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

⁹ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>.

3.3.15 Table 8 outlines the risk category from earthworks and construction activities.

Table 8 Construction Dust - Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.3.16 Table 9 outlines the risk category from trackout activities.

Table 9 Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

3.3.17 The risk of impact associated with each dust generating activity was determined in accordance with the matrices above. The results are provided in Table 10.

Table 10 Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	High	Medium	High
Human Health	Low	Low	Medium

3.3.18 As indicated in Table 10, the potential risk of dust soiling impacts is **high** from earthworks and trackout and **medium** from construction. The potential risk of human health effects is **low** from earthworks and construction and **medium** from trackout.

3.4 Step 3

3.4.1 Step 3 required the identification of site specific mitigation measures in accordance with the IAQM guidance¹⁰ to reduce potential dust impacts based upon the relevant risk categories identified in Table 10. These are summarised in Table 11.

Table 11 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	<ul style="list-style-type: none">• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager• Display the head or regional office contact information• Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	<ul style="list-style-type: none">• 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 BMBC upon request• Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	<ul style="list-style-type: none">• Undertake daily on-site and off-site inspection to monitor dust, record inspection results, and make the log available to BMBC upon request• Carry out regular site inspections, record inspection results, and make an inspection log available to the BMBC upon request• Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	<ul style="list-style-type: none">• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible• Fully enclose site or specific operations where there is a high potential for dust production and they are 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

¹⁰ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Issue	Control Measure
Operating vehicle/machinery and sustainable travel	<ul style="list-style-type: none"> • Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable
Operations	<ul style="list-style-type: none"> • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	<ul style="list-style-type: none"> • Avoid bonfires or burning of waste materials
Earthworks	<ul style="list-style-type: none"> • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil as soon as practicable • Only remove cover in small areas during work and not all at once
Construction	<ul style="list-style-type: none"> • 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
Trackout	<ul style="list-style-type: none"> • Use water-assisted dust sweeper on access and local roads, if required • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials • Record all inspections of haul routes and any subsequent action in a site log book • Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably possible • Implement a wheel washing system, if required • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits • Access gates to be located at least 10m from receptors where possible

3.5 Step 4

3.5.1 Assuming the relevant mitigation measures outlined in Table 11 are implemented, the residual emission impacts from all dust generating activities is predicted to be **not**

significant, in accordance the with the IAQM guidance¹¹. As such, they are considered to comply with comply with the requirements of the BMBC's Air Quality and Emissions Good Practice Planning Guidance¹².

¹¹ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

¹² Air Quality and Emission Good Practice Planning Guidance, BMBC, 2020.

4.0 **ABBREVIATIONS**

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BMBC	Barnsley Metropolitan Borough Council
DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
DfT	Department for Transport
EIA	Environmental Impact Assessment
EV	Electric Vehicle
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
NGR	National Grid Reference
NPPF	National Planning Policy Framework
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm