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INFRASTRUCTURE | BUILDINGS

Environment – Air Quality

Land off Saunderson Road, Penistone

Air Quality Assessment

Environment – Air Quality

Saunderson Road, Penistone

Air Quality Assessment

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EXECUTIVE SUMMARY

An Air Quality Assessment has been undertaken to determine the impacts on local air quality of, and site suitability for, a proposed residential development at land off Saunderson Road, Penistone.

Construction impacts have been assessed and are deemed to be of *Negligible* significance, provided that appropriate mitigation measures are put in place to minimise emissions of dust.

The impact of the development on local traffic flows was considered in relation to existing sensitive receptors, as well as the likelihood of exposing new receptors to poor air quality. The overall impact has been assessed to be *Negligible*.

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1.0 INTRODUCTION

- 1.1 This Air Quality Assessment is for a proposed residential development on land adjacent to Saunderson Road, Penistone, Barnsley. The National Grid Reference for the centre of the Site is: 424050, 403585.
- 1.2 The Site is currently empty and proposals include the construction of approximately 24 houses on a site of approximately 9,200m². An indicative site layout plan can be seen in **Appendix 2**.
- 1.3 The Site is located to the south of the A628, midway between the villages of Penistone and Thurlstone. The Site is predominantly surrounded by residential dwellings on all sides, with open rural land beyond this.
- 1.4 The main pollution sources in the area are vehicles travelling on the local road network, including the A628.
- 1.5 The local authority, Barnsley Metropolitan Borough Council (BMBC), has declared a total of seven air quality management areas (AQMAs) in the Borough. However, the closest AQMA to the Site is the Sheffield City-wide AQMA, which is approximately 3.5km distant and was declared by Sheffield City Council.
- 1.6 This assessment considers the potential for traffic generated by the Proposed Development to affect air quality at nearby sensitive residential receptors and the suitability of the Site for residential use.
- 1.7 To assist the reader, an air quality glossary is included in **Appendix 1**.

2.0 POLICY CONTEXT

The UK Air Quality Strategy (UKAQS)

- 2.1 The UKAQS¹ sets a number of "standard" (AQs) concentrations for a number of key pollutants that are to be achieved at sensitive receptor locations across the UK by various "objective" dates. The sensitive locations at which the standards and objectives apply are places where the population is expected to be exposed to the various pollutants over the particular averaging period. Thus for those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to measure concentrations against the set standards are areas of residential housing, since it is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time. Schools and children's playgrounds are also often used as sensitive locations for comparison with annual mean objectives due to the increased sensitivity of young people to the effects of pollution (regardless of whether or not their exposure to the pollution could be over an annual period). For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time.
- 2.2 The objectives adopted in the UK are based on the Air Quality (England) Regulations 2000², as amended, for the purpose of Local Air Quality Management. These Air Quality Regulations have been adopted into UK law from the limit values required by European Union Daughter Directives on air quality.
- 2.3 Obligations under the Environment Act 1995 require local authorities to declare an AQMA at sensitive receptor locations where an objective concentration has been predicted to be exceeded. In setting an AQMA, the local authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the objective levels.
- 2.4 Following the publication of several review and assessment reports under the Local Air Quality Management (LAQM) regime, informed by the requirements of the Environment Act 1995, BMBC has declared seven AQMAs. However, the closest AQMA to the application site is the Sheffield City-wide AQMA, which is approximately 3.5km distant, was declared by Sheffield City Council.

National Planning Policy Framework (NPPF)

- 2.5 The NPPF, which was published in March 2012³, sets out the Government's planning policy for England. At its heart is an intention to promote more sustainable development. A core principle in the NPPF that relates to air quality effects from development is that planning should "contribute to conserving and enhancing the natural environment and reduce pollution". In achieving this, it states in paragraph 109 that:

"The planning system should contribute to and enhance the natural and local environment by: [...]"

1 Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2) July 2007.

2 The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.

3 National Planning Policy Framework (NPPF). (2012). <https://www.gov.uk/government/publications/national-planning-policy-framework--2>.

preventing both new and existing 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 [...]".

- 2.6 With regard to assessing cumulative effects the NPPF states the following at paragraph 120:

"To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. 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".

- 2.7 The NPPF offers a broad framework, but does not afford a detailed methodology for assessments. Specific guidance for air quality continues to be provided by organisations such as the Department for Environment, Food and Rural Affairs (Defra), Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM).

Planning Practice Guidance (PPG)

- 2.8 PPG32⁴ (Air Quality), which was updated in March 2014, provides guiding principles on how planning can take account of the impact of new development on air quality. The PPG summarises the importance of air quality in planning and the key legislation relating to it.
- 2.9 As well as describing the importance of International, National and Local Policies (detailed elsewhere in this report), it summarises the key sources of air quality information. It also explains when air quality is likely to be relevant to a planning decision:

"Whether or not 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 generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife) [...]"

When deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

- *Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to*

⁴ Planning Policy Guidance (PPG) 32. (2014). Air Quality. <http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/>.

turnover in a large car park; or result in construction sites that would generate Heavy Goods Vehicle flows over a period of a year or more.

- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area.*
- *Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.*
- *Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.*
- *Affect biodiversity. In particular, this is likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites."*

2.10 Details are also provided of what should be included within an air quality assessment. Key considerations include:

- Baseline local air quality;
- Whether the proposed development could significantly affect local air quality during construction/operation; and
- Whether the development is likely to expose more people to poor air quality.

2.11 Examples of potential air quality mitigation measures are also provided in the PPG.

Local Policy and Guidance

2.12 BMBC currently has a Statutory Development Plan, which consists of several documents that inform planning decisions in the Borough. The Core Strategy⁵ includes 'Policy CSP40 – Pollution Control and Protection', which states:

"Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air, surface water and groundwater, noise, smell, dust, vibration, light or other pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people. We will not allow development of new housing or other environmentally sensitive development where existing air pollution, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect of that these can be mitigated against."

⁵ BMBC (2011) Barnsley Local Development Framework – Core Strategy.

-
- 2.13 Furthermore, the Core Strategy includes 'Policy CSP 41 Development in Air Quality Management Areas', however, this does not apply to the proposed development at Saunderson Road as it is not located in, or close to, any AQMAs.
- 2.14 BMBC is currently in the process of producing a new Local Plan for the Borough, which aims to establish policies and proposals up to the year 2033. The new Local Plan⁶ is undergoing public examination and it is hoped that it will be adopted in Summer 2017. Policy CSP 41 has been carried across into this new document as Policy AQ1; there are no other policies proposed concerning air quality.
- 2.15 A set of development maps⁷ have been produced in the process of updating the Local Plan, which show the application site as earmarked for residential development.
- 2.16 In addition, BMBC has produced the 'Air Quality and Emissions Good Practice Planning Guidance'⁸. This document provides clear guidance for planners on the type of assessment required and suitable mitigation measures by classifying proposed developments into three categories. In the case of the development at Saunderson Road, it falls below the 50 dwelling threshold and is therefore classed at 'Minor'.

⁶ BMBC (2016) Local Plan Publication Draft.

⁷ BMBC (2016) Local Plan Maps - <https://www.barnsley.gov.uk/services/planning-and-buildings/local-planning-and-development/our-new-local-plan/local-plan-publication-consultation-2016/>

⁸ BMBC (2014) Air Quality and Emissions Good Practice Planning Guidance.

3.0 BASELINE

UK-AIR Background Pollution

- 3.1 Defra provides estimated background concentrations of the UKAQS pollutants at the UK Air Information Resource (UK-AIR) website, (<http://uk-air.defra.gov.uk>). These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km² National Grid square locations across the UK. These were updated in July 2016 and are based on monitoring data from 2013.
- 3.2 Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emission sources in the general area of a particular grid square location. Concentrations of pollutants at various sensitive receptor locations can, therefore, be calculated by modelling the emissions from a nearby pollution source, such as a busy road, and then adding this to the appropriate UK-AIR background datum.
- 3.3 For the Site, the predicted background pollution concentrations for NO₂ and PM₁₀ for 2015 to 2017 are presented in **Table 3.1**. These data were taken from the central grid square location closest to the Site (i.e. grid reference: 424500, 403500).

Table 3.1 Background Concentrations of Key Pollutants at the Application Site from the UK-AIR

Pollutant	Predicted Background Concentration (µg.m ⁻³)			Pollutant	Standard Concentration (µg.m ⁻³)	Objective: to Achieve the Standard by
	2015	2016	2017			
NO ₂	14.8	14.1	13.5	annual mean	40	31 December 2005
PM ₁₀ *	12.7	12.6	12.4	(gravimetric) annual mean	40	31 December 2004

*Proposed PM₁₀ objectives for 2010 were dropped in the 2007 Air Quality Strategy (there is no AQS for PM_{2.5}, however local authorities are required to work towards reduction).

- 3.4 The data in **Table 3.1** show that annual mean background concentrations of NO₂ and PM₁₀ at the Site from 2015 to 2017 are predicted to be well below their respective AQSs. Concentrations of these pollutants are predicted to decline each year. In 2017, NO₂ and PM₁₀ concentrations are predicted to be below their AQSs by 66% and 69% respectively.

Local Sources of Monitoring Data

Automatic Monitoring

- 3.5 Monitoring at background locations is considered an appropriate source of data for the purposes of describing baseline air quality. BMBC operates a widespread air quality monitoring network, including four automatic monitors. The most recent available data from these monitors are included in **Tables 3.2** and **3.3** below.

Table 3.2 NO₂ Monitoring Data from BMBC Automatic Monitors

Site Name	Type	Distance from Site (km)	NO ₂ Annual Mean Concentration (µg.m ⁻³)			
			2012	2013	2014	2015
CM1 – Barnsley A635	R	12.4	34	32	31	-
CM2 – Barnsley A628	R	9.1	39	37	35	39
CM3 – Barnsley Gawber	UB	9.3	21	22	19	19

Note: "R" = Roadside; "UB" = Urban Background.

- 3.6 The data in **Table 3.2** show that annual mean concentrations of NO₂ were consistently below the 40µg.m⁻³ AQS between 2012 and 2015. The highest recorded concentration was at Barnsley A628 (CM2) at 39µg.m⁻³, which is 3% below the AQS. This monitor is, however, located in a more urbanised area than the Site on one of the main routes into Barnsley. Therefore, it is not considered representative of conditions at the Site.
- 3.7 The closest background monitor to the Site is located at Barnsley Gawber (CM3), which monitored in the range of 45% to 53% below the AQS. These results are higher than the background concentrations predicted by UK-AIR in **Table 3.1**, which may be due to the location of the background monitor on the edge of Barnsley in comparison to the area around the Site which is predominantly rural.

Table 3.3 PM₁₀ Monitoring Data from BMBC Automatic Monitors

Site Name	Type	Distance from Site (km)	PM ₁₀ Annual Mean Concentration (µg.m ⁻³)
			2015
CM1 – Barnsley A635	R	12.4	21

Note: "R" = Roadside.

- 3.8 The only monitor capable of recording PM₁₀ concentrations in the Borough is CM1, which began monitoring in 2014. In 2015, annual mean concentrations of PM₁₀ were 48% below the AQS. As there is only one set of data available, inclusion of this concentration should be treated as indicative.
- 3.9 There are no suitable monitoring results to consider background concentrations at the Site, therefore, the UK-AIR data in **Table 3.1** is thought to be most representative of the Site.

Non-Automatic Monitoring

- 3.10 BMBC operates an extensive non-automatic, NO₂ diffusion tube monitoring network across the Borough, however, it should be noted that there are no diffusion tubes in close proximity to the Site. This is likely to be the result of the local authority positioning its monitors in the area's key pollution hotspots. The most recently available monitoring data for the diffusion tubes closest to the Site are included in **Table 3.4**.

Table 3.4 Monitoring Data from BMBC NO₂ Diffusion Tubes

Site Name	Type	Distance from Site (km)	Annual Mean Concentration (µg.m ⁻³)		
			2013	2014	2015
DT6 - Gilbert Hill - Langsett	R	4.2	31.7	36.2	32.8
DT10 - Midhopestones Eastbound	R	3.7	32.2	31.9	34.7
DT11 - Midhopestones Westbound	R	3.8	34.7	35.6	35.6
DT12 - Langsett Stanley Cottages	R	4.3	41.5	46.2	45.7
DT14 - Langsett School House	R	4.1	66.1	75.1	75.4
DT15 - Langsett Café	R	4.1	42.7	44.8	43.4
DT38 - Langsett Foopath Sign	R	4.2	64.1	67.8	69.9

Note: "R" = Roadside. **Bold** denotes exceedence of AQS.

- 3.11 The data in **Table 3.4** show that annual mean NO₂ concentrations at diffusion tubes varied significantly depending on their location. The highest recorded concentrations were situated on the A616, which is busier and narrower than the A628. Due to the distance of the diffusion tubes from the Site, and their location at busy roadside positions, it is not thought that they are representative of the conditions at the Site.

4.0 Assessment Methodology

Guidance

- 4.1 LAQM.TG16⁹ was followed in carrying out the assessment. Guidance published by the IAQM¹⁰ on the 'Assessment of Dust from Demolition and Construction' was used when assessing the construction phase of the Proposed Development. The Greater London Authority's Supplementary Planning Guidance (SPG)¹¹ for the control of dust from construction has also been referred to. Whilst produced for developments in London, it is seen as a high standard for developments across the UK. It provides a number of mitigation measures that should be adopted to minimise impacts of dusts and fine particles.
- 4.2 The latest Environmental Protection UK (EPUK) and IAQM guidance, published in May 2015 on 'Planning For Air Quality'¹² has also been followed in assessing air quality at the Site and is particularly important for determining the significance of effects at each stage.

Construction Phase

- 4.3 The construction phase of the Proposed Development will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust. However, they could also include releases of odours and/or more harmful gases and particles.
- 4.4 The IAQM's guidance to assess the impacts of construction on human and ecological receptors has been followed in carrying out this Air Quality Assessment. The guidance suggests that where a receptor is located within 350m of a site boundary and/or within 100m of a route used by construction vehicles, up to 500m from the site entrance, a dust assessment should be undertaken. High sensitivity receptors are considered particularly sensitive when located within 20m of a works area. **Figure 1** shows receptors that could be sensitive to dust that are located within 350m of the boundaries of the Site.
- 4.5 Development of the Site is due to start in November 2017 with the groundwork, with a view to beginning construction in January 2018.
- 4.6 Review of Defra's Multi Agency Geographic Information for the Countryside (MAGIC) website (<http://www.magic.gov.uk>), which incorporates Natural England's interactive maps, has not identified any ecologically sensitive receptor within 100m, nor indeed 1km of the Site or the construction route. Therefore, the Proposed Development will have a *Negligible* impact on ecological receptors and this has not been considered further within this assessment.
- 4.7 BMBC monitoring of PM₁₀ shows that concentrations were well below the AQS in the area, despite the monitor being located in a more urban area than the Site; therefore PM₁₀ is not considered to be an issue at the Site and adjacent uses.

9 Defra. 2016. Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management, Technical Guidance LAQM. TG16. London: Defra.

10 IAQM. (2014). Guidance on the Assessment of Dust from Demolition and Construction.

11 Greater London Authority. (2014). The control of dust and emissions during construction and demolition – Supplementary Planning Guidance.

12 EPUK & IAQM. (2015). Land-Use Planning & Development Control: Planning For Air Quality.

- 4.8 The IAQM guidance suggests Demolition, Earthworks, Construction, and Trackout should all be assessed separately to determine the overall significance of the construction phase.

Construction Significance

- 4.9 In the IAQM dust guidance, the first step in assessing the risk of impacts is to define the potential dust emission magnitude. This can be considered 'Negligible', 'Small', 'Medium' or 'Large' for each of the construction stages. Whilst the IAQM provides examples of criteria that may be used to assess these magnitudes, the vast number of potential variables means that every site is different and therefore professional judgement must be applied by what the IAQM refer to as a "technically competent assessor". The construction phase assessment therefore relies on the experience of the appraiser.
- 4.10 As such, attempts to define precisely what constitutes a negligible, small, medium or large dust emission magnitude should be treated with caution. Factors such as the scale of the work, both in terms of size and time, the construction materials and the plant to be used must be considered.
- 4.11 The second step is to define the sensitivity of the area around the construction site. As stated in the IAQM guidance:
- "the sensitivity of the area takes into account a number of factors:*
 - the specific sensitivities of receptors in the area;*
 - the proximity and number of those receptors;*
 - in the case of PM₁₀, the local background concentrations; and*
 - site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust."*
- 4.12 Based on these factors, the area is categorised as being of 'Low', 'Medium' or 'High' sensitivity.
- 4.13 When dust emission magnitudes for each stage and the sensitivity of the area have been defined, the risk of dust impacts can be determined. The IAQM provides a risk of impacts matrix for each construction stage. The overall significance for the construction phase can then be judged from the stages assessed. Again, this is subject to professional judgement.

Operational Phase

Vehicle Emissions

- 4.14 Vehicle emissions will arise from the combustion of fossil fuels in vehicle engines and their subsequent release to atmosphere via tailpipe exhausts. The most significant pollutants released by cars and other vehicles are oxides of nitrogen (NO₂/NO_x) and fine particulate matter (PM₁₀ and PM_{2.5}). Releases of carbon monoxide (CO) and some volatile hydrocarbons (e.g. benzene and 1,3-butadiene) are of less significance and are not assessed further in this report.
- 4.15 As it is elevated annual mean concentrations of NO₂ and PM₁₀ that have resulted in the declaration of most AQMAs across the UK, these are the pollutants of most concern and they have therefore been the focus of this Air Quality Assessment.

- 4.16 The Proposed Development comprises relatively few dwellings for a site of its size and is in-keeping with the predominantly residential surrounding area. With only 24 dwellings onsite it is considered unlikely that there will be an additional 500 vehicle movements per day, which the EPUK and IAQM guidance gives as an indicative threshold for increased Average Annual Daily Traffic (AADT) flow, outside of an AQMA, that could cause a significant impact on local air quality. Therefore, a detailed assessment of operational phase impacts is not thought to be necessary and a qualitative/semi-quantitative assessment has been undertaken with reference to the EPUK & IAQM guidance.

Consultation

- 4.17 The scope of the assessment was sent to the Environmental Health department of BMBC in March 2017. The proposed scope of assessment was agreed by the Technical Officer for Pollution Control.

5.0 Construction Impacts

- 5.1 The construction phase of the Proposed Development will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust. A detailed construction schedule is not currently available. The total Site area is approximately 9,200m².
- 5.2 The estimates, using the IAQM guidance, for the dust emission magnitudes at the Site for demolition, earthworks, construction and trackout are discussed below.

Dust Emission Magnitude

Demolition

- 5.3 The Site is currently vacant, therefore demolition has been scoped out of this assessment.

Earthworks

- 5.4 At approximately 9,200m², the Site falls within the IAQM's 'medium' category of 2,500m² to 10,000m² (i.e. <1ha). However, it is anticipated that there will be less than 5 earth moving vehicles operating at any one time, which is classed as 'small'.
- 5.5 It is not anticipated that any bunds will be formed during earthworks.
- 5.6 Overall, the earthworks phase is considered to have a *Medium* dust emission magnitude.
- 5.7 There are no known records of contamination at the Site, therefore potential health effects from the release of contaminated dusts are not considered in this report and it is assumed that this will be covered in a separate specialist assessment, if required.

Construction

- 5.8 There are a number of particularly dusty activities that commonly take place during the construction stage, such as piling, sandblasting and concrete batching. Stockpiling and the general handling of construction materials also have the potential to generate dust emissions. However, few high risk activities are expected for the Proposed Development.
- 5.9 Construction is due to begin in January 2018. The houses will be made of bricks and mortar with tiled roofs to remain in-keeping with the existing aesthetics of the area. Generally, these materials are expected to have a low to moderate potential for dust release.
- 5.10 The total building volume of the 24 additional dwellings is expected to be well within the IAQM's 'Small' category (<25,000m³). Based on the above information, the construction phase is expected to have a *Small* dust emission magnitude, overall.

Trackout

- 5.11 Construction traffic, when travelling over soiled road surfaces, has the potential to generate dust emissions and also to soil the local road network. During dry weather,

un-surfaced and soiled roads can lead to dust being emitted due to pick-up by vehicle wheels. The potential for roads to be soiled is dependent on the length of the onsite unpaved road.

- 5.12 There are expected to be fewer than 10 heavy duty vehicles accessing the Site per day, which falls into the IAQM's 'Small' category. It is not known at this point whether there will be any unpaved road surfaces. However, given the size of the Site it is unlikely that there will be more than 100m of unpaved road surface used. Therefore, for trackout, the development is considered to have a *Small* dust emission magnitude.
- 5.13 Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the Site will also be released. However, the volumes and periods over which these releases will occur are unlikely to result in any significant peaks in local air pollution concentrations and therefore this has been scoped out of the assessment.

Construction Risk Summary

- 5.14 The summary of the dust emission magnitude as a result of the activities of Demolition, Earthworks, Construction and Trackout, as specified in the IAQM guidance and discussed above, are listed in **Table 5.1** below. Overall, the dust emission magnitude is predicted to be *Small*.

Table 5.1 – Emission Magnitude and PM₁₀ Risk for Construction, Based on the IAQM's Dust Guidance

Source	Dust Emission Magnitude
Demolition	N/A
Earthworks	Medium
Construction	Small
Trackout	Small

Sensitivity of the Area

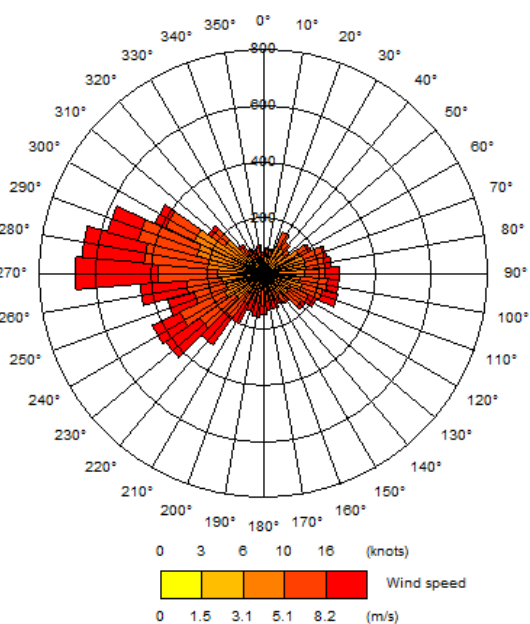
- 5.15 Having established the emission magnitude for dust above, the sensitivity of the area must be considered to establish the significance of effects. The effect of dust emissions depends on the sensitivity of each receptor. High sensitivity human receptors include residential dwellings, schools and hospitals.
- 5.16 The impacts of dust emissions from the sources discussed above have the potential to cause an annoyance to human receptors living in the local area. Within distances of 20m of the Site boundary, there is a high risk of dust impacts, regardless of the prevailing wind direction. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the dust source.
- 5.17 With the exponential decline in dust with distance from dust generating activities, it is considered that for receptors more than 350m from the Site boundary, the risk is negligible. Furthermore, the risks at over 100m are only likely to be significant in certain weather conditions, e.g. downwind of the source during dry periods.
- 5.18 The approximate number of high sensitivity human receptors in the vicinity of the Site is detailed in **Table 5.2** below, with distance contours shown in **Figure 1**. The main sensitive

receptors are residential dwellings within 20m of the Site, which may therefore be quite susceptible to soiling and PM₁₀ generating activities. However, it is noted that there are no other highly sensitive receptors in the vicinity of the Site.

Table 5.2 Approximate Number of High Sensitivity Human Receptors Close to the Application Site

Distance to site (m)	Approximate Number of High Sensitivity Receptors	Details
<20	20	Dwellings on Thurlston Road and Saunderson Road.
20-100	70	Dwellings on Thurlston Road, Saunderson Road and Miner Avenue.
100-350	100	Dwellings in wider area.

Plate 5.1 Wind Rose for Emley Moor, 2013.



- 5.19 **Plate 5.1** above shows the prevailing wind is westerly. The main sensitive receptors are the residential dwellings located to the east of the Site as they are likely to be downwind of any wind-blown dust from the construction activities at the Site.
- 5.20 The potential sensitivity of the area surrounding the application site to dust soiling effects is considered to be Low, with the likelihood of exceedences of the PM₁₀ AQS also considered Low.

Risk of Impacts

- 5.21 Having established the likely dust emission magnitude and sensitivity of the area, the risk of impacts can be determined in accordance with the IAQM guidance. These are summarised in **Table 5.3**.

Table 5.3 Summary Risk Effects of Construction, Based on the IAQM's Dust Guidance

Source	Dust Effects	Ecological Effects	PM ₁₀
Demolition	Negligible	Negligible	Negligible
Earthworks	Low Risk	Negligible	Negligible
Construction	Negligible	Negligible	Negligible
Trackout	Negligible	Negligible	Negligible

- 5.22 Overall, the development is considered *Low Risk* for dust soiling effects and *Negligible* for PM₁₀ health effects, in the absence of mitigation.

Site Specific Mitigation

- 5.23 The Greater London Authority guidance¹¹, which is used as a benchmark across the UK, suggests a number of mitigation measures that should be adopted in order to minimise impacts from dusts and fine particles. Appropriate measures that could be included in the construction of the Proposed Development are as follows:

- ideally cutting, grinding and sawing should not be conducted on-site and pre-fabricated material and modules should be brought in where possible;
- where such work must take place, water suppression should be used to reduce the amount of dust generated;
- skips, chutes and conveyors should be completely covered and, if necessary, enclosed to ensure that dust does not escape;
- no burning of any materials should be permitted on site;
- any excess material should be reused or recycled on-site in accordance with appropriate legislation;
- developers should produce a waste or recycling plan;
- following earthworks, exposed areas and soil stockpiles should be re-vegetated to stabilise surfaces, or otherwise covered with hessian or mulches;
- stockpiles should be stored in enclosed or bunded containers or silos and kept damp where necessary;
- hard surfaces should be used for haul routes where possible;
- haul routes should be swept/washed regularly;
- vehicle wheels should be washed on leaving the Site;
- all vehicles carrying dusty materials should be securely covered; and
- delivery areas, stockpiles and particularly dusty items of construction plant should be kept as far away from neighbouring properties as possible.

- 5.24 In addition, the IAQM lists recommended mitigation measures for low, medium and high Dust Impact Risks. The highly recommended measures for Low Risk sites are included in **Appendix 3** of this report.
- 5.25 Where dust generation cannot be avoided in areas close to neighbouring properties, additional mitigation measures should be put in place, such as: windbreaks, sprinklers, and/or time/weather condition limits on the operation of some items of plant or the carrying out of potentially dust-generating activities.

Residual Effects

- 5.26 After the implementation of the mitigation measures listed above and in **Appendix 3**, the significance of each phase of the construction programme will be reduced and there are not expected to be any significant residual effects during the construction phase.

6.0 Operational Impacts

Existing Receptors

- 6.1 With reference to the EPUK & IAQM guidance, a development is unlikely to significantly affect air quality outside of an AQMA unless it changes Annual Average Daily Traffic (AADT) flows by more than 500 light vehicle movements. The Proposed Development comprises 24 dwellings, which is extremely unlikely to approach the 500 movements threshold. It is therefore considered highly unlikely that the Proposed Development would have a significant impact on existing sensitive receptors.
- 6.2 Furthermore, the BMBC air quality guidance outlines the minimum mitigation steps that must be taken for proposals depending on the scale of development. Criteria in the guidelines state that if a development has less than fifty dwellings, it is classed as 'Minor'. Mitigation measures for all developments, including those classed as 'Minor', suggest developers could provide one charging point for electric vehicles (EV) per dwelling with a dedicated parking space to encourage the uptake of EVs. Consequently, it may be argued that emissions from the proposed development may be less in the future than originally expected as the infrastructure may be in place to facilitate EV uptake.

Proposed Receptors

- 6.3 EPUK & IAQM guidance states that smaller proposals may not significantly add to air pollution concentrations, but significant impacts could still be experienced due to the introduction of new receptors into an area of poor air quality. This is unlikely to be the case for the Proposed Development at Saunderson Road as ambient pollution concentrations are believed to be well within the short and long term AQSs for NO₂ and PM₁₀.
- 6.4 Furthermore, the main source of pollution in the area is the A628, however, the closest proposed residential dwelling is set back from the road by approximately 40m allowing substantial dispersion of pollutants. It should be noted that diffusion tube monitoring guidance¹³ states that:
- "at distances of more than 50m from a busy road, it is anticipated that NO₂ concentrations will have been diluted to the local urban background concentration"*
- 6.5 A busy road is defined in the guidance as >30,000 vehicles per day, which is far greater than the traffic flow on the A628 (circa 13,141 according to DfT traffic counts¹⁴). Also, the local 'urban background concentration' shown in **Table 3.2** at monitor CM3 recorded annual mean concentrations of NO₂ in the range of 19µg.m⁻³ to 21µg.m⁻³ between 2012 and 2015; this monitor is situated in a more urbanised area than the Site. Therefore, it can be reasonably expected that the concentration of NO₂ at the Proposed Development will have dispersed to a level well below the AQS, making it suitable for its intended residential use.

¹³ AEA Energy & Environment (2010) Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance.

¹⁴ Department for Transport (DfT) (2017) Traffic Counts.

Mitigation Required

- 6.6 Based on the BMBC 'Air Quality and Emissions Good Planning Guidance', the proposed development is classified as 'Minor' as less than 50 dwellings are proposed for the Site. The guidance suggests that mitigation for 'Minor' application sites could include:
- (i) 1 electric vehicle (EV) charging point per dwelling with dedicated parking or 1 EV charging point per 10 spaces with unallocated parking;
 - (ii) Use of green infrastructure;
 - (iii) Provision of secure cycle storage; and/or
 - (iv) Provision of incentives for the use of public transport.
- 6.7 It should also be noted, that many measures employed to mitigate traffic impacts, may also be considered air quality mitigation measures.

7.0 Discussion

- 7.1 BMBC has declared seven AQMAs in the area due to elevated concentrations of NO₂; the Site is located approximately 3.5km north of the closest AQMA, meaning that it is unlikely to be affected by the Proposed Development.
- 7.2 Monitoring data from the surrounding areas indicate that annual mean concentrations of NO₂ were occasionally above the 40µg.m⁻³ AQS, but these tended to be roadside monitors in more urbanised areas of Barnsley. Background pollution concentrations at the Site are expected to be well below the key AQSs, in accordance with UK-AIR predictions.
- 7.3 The Proposed Development is expected to generate far fewer than 500 vehicle movements per day, as only 24 dwellings are proposed. Furthermore, background air quality in the area is relatively good. Therefore, there are not expected to be any significant air quality effects at existing or proposed sensitive receptors.
- 7.4 Some mitigation measures have been suggested in line with the BMBC '*Air Quality and Emissions Good Practice Planning Guidance*' recommendations for 'minor' developments.
- 7.5 The construction of the Proposed Development could give rise to emissions that have the potential to cause some dust soiling effects on adjacent uses, although there are relatively few sensitive receptors in close proximity to the Site. By adopting appropriate mitigation measures to reduce emissions and their potential impact, there should be no significant residual effects.
- 7.6 The Proposed Development is expected to comply with the requirements of the NPPF as it will not cause any unacceptable air pollution risks to either existing or proposed receptors. The development is also expected to comply with local policies, specifically CSP40, as it is not considered likely to significantly increase air pollution. As such, the Site is considered to be an appropriate location for a development of this type, with respect to air quality.

8.0 CONCLUSIONS

- 8.1 This report has assessed current air quality at the Site at land off Saunderson Road and potential for traffic generated by the Proposed Development to negatively impact nearby existing receptors.
- 8.2 Site-specific background UK-AIR and monitoring results from the wider area suggest that air quality at the Site is below AQS concentrations for NO₂ and PM₁₀.
- 8.3 The Proposed Development is not expected to significantly increase traffic flows in the immediate area; therefore it is not expected to significantly affect air quality at sensitive receptors located close to affected roads.
- 8.4 During construction, with the adoption of appropriate mitigation measures, dust emissions should not cause any significant off-site effects.
- 8.5 Considering the above, the Proposed Development has been determined to be acceptable in terms of its impact on, and sensitivity to, local air quality.
- 8.6 The Proposed Development is expected to comply with all relevant air quality policy. Air quality should not, therefore, pose any significant obstacles to the planning process.

FIGURES

FIGURE 1

Construction Phase Receptors



Figure 1: Construction Phase

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Job No: 7192.S
 Drawn by: LG
 Date: 30/03/2017

APPENDICES

APPENDIX 1

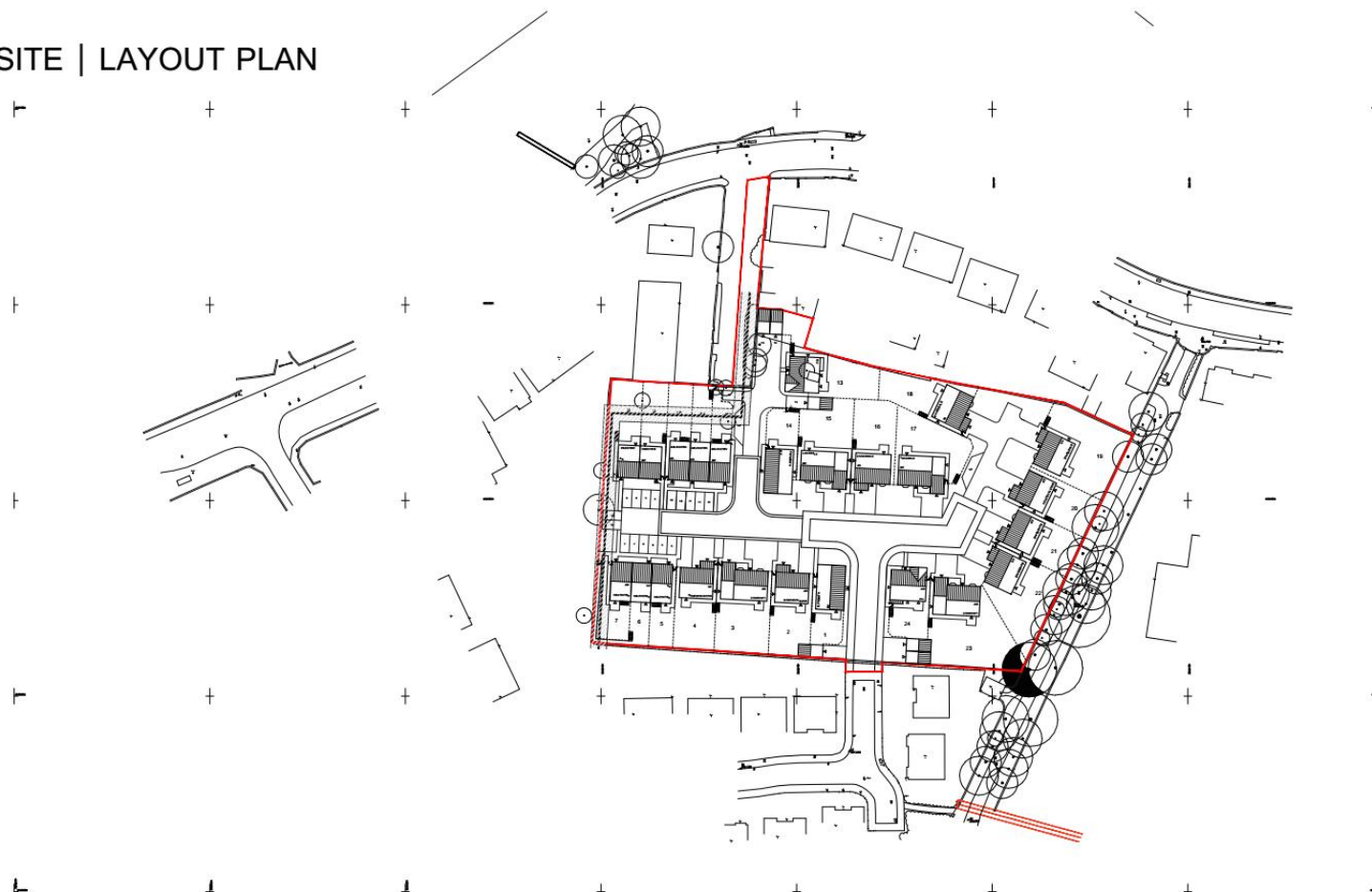
Air Quality Glossary

Term	Definition
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between two years, which is useful for pollutants that have higher concentrations during the winter months.
AQAP	Air Quality Action Plan.
AQMA	Air Quality Management Area.
AQS	Air Quality Standard.
Defra	Department for Environment, Food and Rural Affairs.
Exceedence	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
HDV	Heavy Duty Vehicles, (HGVs + buses)
HGV	Heavy Goods Vehicles.
IAQM	Institute of Air Quality Management.
LAQM	Local Air Quality Management.
LDV	Light Duty Vehicles (motorbikes, cars, vans and small trucks)
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO ₂	Nitrogen dioxide.
NO _x	Nitrogen oxides.
O ₃	Ozone.
Percentile	The percentage of results below a given value.
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
µg.m ⁻³ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1 µg.m ⁻³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UK-AIR	UK Air Information Resource – A source of air quality information provided by Defra.
UKAQS	United Kingdom Air Quality Strategy.

APPENDIX 2

Indicative Site Layout

SITE | LAYOUT PLAN



Revision notes:			Revision notes:			Revision notes:			Project:		Date:
Rev:	Date:	Notes:	Rev:	Date:	Notes:	Rev:	Date:	Notes:	Drawn By:	Scale & Alt:	Revisions:
A	14.02.17	Private drive amended in front of plots 5-12, drives wider, visitor parking added & plot 13 amended to avoid using Bent Street.	-	-	-	-	-	-	CD	1:500	A
									Project:		Date:
									Bentons Road, Penistone		15.02.17
									Drawing Number:		Scale & Alt:
									0105-100		1:500
									Drawn By:		Revisions:
									CD		A

APPENDIX 3

IAQM Recommended Mitigation Measures

Please refer to the IAQM's Construction Dust Guidance for further, "desirable", 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 the complaints log available to the local authority when asked.
- Record any exception incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of 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 possible.
- Erect solid screens or barriers around dusty 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 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.

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 equipment wherever appropriate.

Waste Management

- Avoid bonfires and burning of waste materials.

BWB

