

AIR QUALITY SCREENING ASSESSMENT

on behalf of

GLADMAN DEVELOPMENTS LIMITED

for

FRYATTS WAY, BEXHILL, EAST SUSSEX

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Summary

This air quality report is submitted in relation to an outline planning application for residential development at land off Fryatts Way, Bexhill, East Sussex.

This report provides a review of existing air quality in the vicinity of the proposed development. It also provides a simple assessment of the impact of the proposed development on local air quality during its operational phase.

Existing air quality around the development has been reviewed. Concentrations of NO₂ and PM₁₀ are likely to be well below their respective long and short-term objectives at the proposed development site which is therefore considered suitable for residential use with regards to air quality.

A worst-case scenario using the highest possible traffic flow data has been considered in examining the potential impact of the development on local air quality. Given the very low levels of NO₂ and PM₁₀ at the site currently, the impact of the development on local air quality is not expected to be significant in air quality terms. However, in accordance with local guidance, a preliminary emission damage calculation has been completed and mitigation considered. It is proposed that a detailed damage cost assessment and mitigation scheme, including for demolition and construction dust, be provided at reserved matters stage.

There is, therefore, no reason for this development to be refused on the grounds of air quality.



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1 Introduction

- 1.1 This air quality report is submitted in support of an outline planning application for residential development at land off Fryatts Way, Bexhill, East Sussex. The site lies within the administrative boundary of Rother District Council (RDC).
- 1.2 The report provides a review of the existing air quality in proximity to the proposed development site and assesses the potential impact of the proposed development on local air quality, in accordance with Local Air Quality Management Technical Guidance¹.
- 1.3 Air pollution in urban areas is generally dominated by emissions from road vehicles. The quantity and composition of vehicle emissions is dependent on the type of fuel used, engine type, size and efficiency, vehicle speeds and the type of exhaust emissions abatement equipment employed.
- 1.4 The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO₂) and fine particulates normally assessed as the fraction of airborne particles of mean aerodynamic diameter less than ten micrometres (PM₁₀), since these pollutants are most likely to approach their respective air quality objectives in proximity to major roads and in congested areas. This assessment has therefore focused on the impact of the proposed development on concentrations of NO₂ and PM₁₀.

2 Site Description

- 2.1 The site is located approximately 1.45 km to the west of Bexhill town centre and is currently vacant land accessed of Fryatts Way.
- 2.2 The site is located within the urban area of Bexhill. To the north and west of the site lies the Highwoods Golf Course, beyond which is Turkey Road and Ibstock Brickworks. To the east of the site, there are residential dwellings, beyond which is Fryatts Way. To the south of the site lies Broad Oak Park.
- 2.3 The site is not located within an Air Quality Management Area (AQMA); there are no AQMA's within RDC. The site location is shown in **Appendix A.**

3 Proposed Development

- 3.1 The development consists of approximately 210 residential units including 30% affordable housing.
- 3.2 The transport consultant for the development, WYG Environment Planning Transport Limited, advises that, in the worst-case scenario of upto 210 dwellings being built on the land, the development is expected to introduce an increase in AADT of approximately 1188 LDV and 10 HDV (0.8% of AADT) movements on Fryatts Way. After Fryatts Way, circa 32% (380 LDV AADT) trips will proceed to/from the north along Ellerslie Lane and the

¹ Department for the Environment Food and Rural Affairs (2018) 'Local Air Quality Management Technical Guidance Document LAQM.TG (16)', London: Defra.

remaining 68% (808 LDV AADT) trips will proceed to/from the south along Ellerslie Lane. Traffic will quickly disperse across the road network thereafter.

4 Policy Context

4.1 Standards and Objectives

- 4.1.1 The standards and objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations 2002; the Air Quality Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance.
- 4.1.2 The current air quality standards and objectives (for the purpose of LAQM) are presented in **Table 1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

Dellutent		To be	
Pollutant	Concentration	Measured As*	Achieved by
Nitrogen dioxide (NO2)	200 μg/m³	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 μg/m ³	Annual mean	31/12/2005
Particles (PM ₁₀)	50 μg/m ³	24-hour mean not to be exceeded more than 35 per year	31/12/2004
	40 μg/m ³	Annual mean	31/12/2004
Dortiolog (DM, -)	25 μg/m³	Annual mean (target)	2020
Particles (PM _{2.5})	15% cut in ann	ual mean (urban background exposure)	2010-2020

Table 1: Air Quality Strategy Objectives (England) for the Purposes of Local Air Quality Management

Note:*how the objectives are to be measured is set out in the UK Air Quality (England) Regulations (2000).

- 4.1.3 Where an air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as AQMAs and take action to work towards meeting the objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the objectives and to improve air quality locally.
- 4.1.4 Possible exceedances of air quality objectives are generally assessed in relation to those 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.

4.2 Sussex-air Air Quality and Mitigation Guidance

4.2.1 RBC is part of a group of local authorities in Sussex which have come together to tackle air quality. The group have published guidance² for developers in relation to assessment and mitigation of new developments which incorporates a number of checklists. As this development is categorised as a major development, an air quality assessment and emissions mitigation assessment are required.

5 Methodology

5.1 Data Sources

5.1.1 The air quality assessment of the proposed development was undertaken with reference to information from a number of sources, as detailed in **Table 2**.

Data Source	Reference
Rother District Council (RDC)	RDC (2020) 2018 Air Quality Annual Status Report for Rother District Council
Department for Environment Food and Rural Affairs (Defra)	Defra (2018) Local Air Quality Management Technical Guidance TG(16)
Defra's LAQM Support Tools	Local Air Quality Management 1 km x 1 km grid background pollutant maps
Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM)	EPUK and IAQM (January 2017) Land Use Planning and Development Control: Planning for Air Quality (v1.2)
Institute of Air Quality Management (IAQM)	IAQM (2014) Assessment of Dust from Demolition and Construction

Table 2: Key Information Sources

5.2 Air Quality Assessment

- 5.2.1 A screening assessment of air quality in terms of the impact of the development on concentrations of NO₂ and PM₁₀, which relies on already published information and without quantification of impacts, has been completed using sources such as the Local Authority's monitoring network and the Defra LAQM support tools.
- 5.2.2 A preliminary damage cost calculation has also been completed in accordance with the Sussex-air guidance. The DEFRA Emission Factors Toolkit (EFT v10.1) has been used to determine the emissions to air from road traffic associated with the development. The damage cost procedure has been completed for NO_x and PM_{2.5}.

² Sussex-air (2019, 'Air Quality and emissions mitigation guidance for Sussex (2019)'

- 5.2.3 The input data into the EFT are as follows:
 - Base Year 2019;
 - Opening Year 2024 (5 years calculated: 2024, 2025, 2026, 2027, 2028);
 - Road Type Urban (not London);
 - Total development flows: 1043 AADT, 0.8 HGV%;
 - Speed- 48 kph; and
 - Link Length- 10 km
- 5.2.4 The damage cost procedure requires PM₁₀ to be calculated initially, then a conversion factor is applied to determine the PM_{2.5} emissions. The central road transport conversion factor 0.635 has been used.
- 5.2.5 DEFRA have published guidance³ on the calculation of damage costs which sets out a calculation method for damage costs and have provided an excel-based tool, Defra's Air Quality Damage Cost Appraisal calculator, for calculations. The excel-based tool is used to appraise air quality impacts which identify cost damage vales to use, converts damage costs to relevant base year prices, uplifts damage cost and completes the calculation. The tool has been used within this assessment and cental present values have been utilised.

6 Baseline Air Quality

6.1 Introduction

6.1.1 The site is not located within an Air Quality Management Area (AQMA). Baseline air quality at the proposed development has been established by examining monitoring data produced by RDC and background concentration maps provided by Defra for the grid squares covering the proposed development.

6.2 Local Authority Air Quality Monitoring

Nitrogen Dioxide (NO₂)

- 6.2.1 RDC does have automatic monitoring sites within its authority. The closest automatic monitoring site, RY2, is approximately 3.1 km to the south-east of the development site, adjacent to the A259 road. Due to its location, the automatic station is not representative of site conditions.
- 6.2.2 RDC undertake diffusion tube monitoring of NO₂ across its authority. There are three diffusion tubes within approximately 2 km of the proposed development.

³ DEFRA January 2019 Air Quality Damage Cost Guidance

6.2.3 The results from these monitoring sites⁴ are shown in

Site ID and Type	١٥	Location		Annual Mean NO ₂ Concentrations (µg/m ³)			
	_0	oulion	2015	2016	2017	2018	2019
DT7 (Kerbside)	574296	108917	16.3	24.6	21.2	21.6	18.8
DT22 (Kerbside)	573985	107409	27.4	37.6	29.0	28.8	21.5
DT25(Kerbside)	573871	108033	-	38.0	29.7	29.8	22.0
DT31 (Kerbside)	570366	107817	-	-	25.4	24.6	22.2
Annual Mean N	O2 air qualiity	objective		40 µg/m 3			

6.2.5 Table 3; the locations of the tubes are shown in Appendix A.

Table 3: Annual Mean NO₂ Concentrations Monitored by the LA within the Study Area

- 6.2.6 The monitoring results in **Table 3** indicate that annual mean concentrations of NO₂ have been well below the NO₂ annual mean objective at these monitoring locations since 2015. Indeed, all of these results were at least less than 75% of the annual mean objective since 2017.
- 6.2.7 The results also indicate that the short-term objective for NO₂ is unlikely to be exceeded at the monitoring sites as annual mean concentrations are less than 60 μgm³¹.

Particulate Matter (PM10)

6.2.8 RDC does undertake PM₁₀ monitoring. However, the closest PM₁₀ monitoring station, RY2, is not representative of site conditions as discussed before.

6.3 **DEFRA Background Concentrations**

6.3.1 There are no background monitoring locations in the vicinity of the proposed development site and neighbouring residential areas. Background concentrations of NO₂ and PM₁₀ were therefore obtained from the background concentration maps provided by Defra for the grid squares covering the proposed development⁵. These are shown in **Table 4** below.

⁴ <u>http://www.sussex-air.net/Tools/NO₂DiffusionMap.aspx</u>

⁵ http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017

Table 4: Background Pollutant Concentrations Obtained for the 1km x 1km Grid Squares Covering the Site*

Grid	Pollutant	2017	2020
Square	Fondant	(µg/m³)	(µg/m³)
572500, 108500	NO ₂	9.84	8.78
372300, 100300	PM ₁₀	14.72	14.30

* Background concentrations obtained from the latest 2017 based background maps

7 Effect of Air Quality on the Development

- 7.1 **Table 4** indicates that background concentrations are very low and well below the relevant annual air quality objectives. It is expected that most of this site will be close to these levels of exposure; the vast majority of the site is more than 200 m from main roads and industrial emissions, including the lbstock brickworks.
- 7.2 In terms of local monitoring, DT7 is described as kerbside monitoring site located on the roadside of Holliers Hill, approximately 1 m from the kerbside. It is located beside a junction and adjacent to B2182 and is likely to be exposed to higher volumes of congested traffic than the development site.
- 7.3 DT22 is also described as a kerbside monitoring site; it is placed close to the traffic lights on Sackville Road. The diffusion tube is likely to expose to higher volumes of congested traffic than the development site.
- 7.4 DT25 is described as another kerbside monitoring site and is located on the A259 close to the traffic lights of a busy road. The diffusion tube is likely to experience the traffic flows which slow down near the traffic lights.
- 7.5 DT31 is a new monitoring site and it is also described as Kerbside. It is placed at 128 Barnhorn Road (A259). Again, it is likely to expose to higher volumes of congested traffic than the development site
- 7.6 Since 2015, all of the diffusion tubes identified have been below the annual-term NO₂ objective. All of these the monitoring sites are kerbside sites, located on busier roads than those adjacent to the development site and thus they are not representative of conditions at the development site. However, they do indicate that levels of NO₂ at and close to the development will be well below the annual average objective.
- 7.7 Given the lower levels of road traffic adjacent to the development site and surrounding roads compared to the development site, it is highly likely that this site will experience lower NO₂ concentrations than those measured at the diffusion tubes.

8 Impact of the Development on Existing Air Quality

8.1 Road Traffic Assessment

8.1.1 As discussed above, the development is not located within or adjacent to an AQMA and is expected to introduce changes in AADT flows of approximately 1043 LDV and 8 HDV on the access road and Fryatts Way, with road traffic quickly dispersing across the road network thereafter. As the change in AADT is more than 500 LDV,

IAQM guidance⁶ indicates that the impact of road traffic associated with the development could have a significant impact on local air quality.

- 8.1.2 However, the evidence from background maps and nearby diffusion tubes indicates that levels of NO₂ across the development site and local roads are likely to be well below the relevant annual air quality objectives and will lie somewhere between the background levels of less than 10 µgm⁻³ for NO₂ and less than 15 µgm⁻³ for PM₁₀. The annual mean NO₂ concentrations at nearby main roads have been close to or less than 30 µgm⁻³ since 2017.
- 8.1.3 To create a breach of the annual air quality objective for NO₂, an increase of more than 10 μgm⁻³ associated with the development would be required. Even if a rise in NO₂ levels of 10 μgm⁻³ were to occur, the impact, when considered in accordance with IAQM guidance would be, slight.
- 8.1.4 In our experience, this site is highly unlikely to increase NO₂ levels by more than 10 µgm⁻³ even on Fryatts Way, We do not, therefore, propose to complete detailed modelling for this site. In line with the Sussex-air guidance, however, a preliminary damage cost calculation has been completed and mitigation to minimise air quality impacts to meet the current Sussex-air guidance has been reviewed.

8.2 Emissions Calculator

8.2.1 Emissions have been calculated on the basis of upto 210 dwellings being built and a resulting increase in AADT of 1043 LDV and 0.8% HDV. **Table 5** below shows the damage costs calculation for PM_{2.5} and NO_x. The total emissions and cost for all five assessed years between 2024 to 2028 is displayed in Table 5.

Pollutant	Annual Emissions (kg/yr) (from the EFT calculation)	Annual Emissions (tonne/yr)	Damage Costs per Pollutant per year*		
NOx	2,993.19	2.99	£32,765		
PM _{2.5}	609.81 (PM ₁₀)	0.39 (PM _{2.5})	£37,998		
Total Damage Cost Associated with the Development over a year£70,763					

Table 5: Base Impact Damage Costs Calculation

*Including 2% uplift, in accordance with Defra guidance

8.3 Mitigation

- 8.3.1 To meet the requirement of the Sussex-air Guidance, all residential developments are expected to provide the following mitigation:
 - Mitigation of demolition and construction dust in accordance with the Institute of Air Quality Management (IAQM) guidance on the Assessment of Dust from Demolition and construction. There is little detail available at the present time in terms of the construction methodologies to be employed across this site. This assessment can be carried out at reserved matters stage;
 - All gas boilers to meet a minimum standard of <40 mgNox/kWh;

⁶ EPUK and IAQM (January 2017) Land Use Planning and Development Control: Planning for Air Quality (v1.2)

- Active charging points for electric vehicles to be provided at 20% of all parking spaces with cable ducting provided at all remaining spaces to provide "passive" provision for these spaces to receive electric vehicle charge points in the future.
- 8.3.2 As this application is an outline application and the number of dwellings is not yet fixed, it is proposed that a detailed damage cost assessment and mitigation scheme be provided at reserved matters stage.

9 Summary of Impacts and Conclusion

- 9.1 The suitability of the site for residential use with regards to air quality was considered. Annual concentrations of NO₂ and PM₁₀ at and close to the development site are expected to be well below the respective air quality objectives. The site is, therefore, suitable for development in air quality terms.
- 9.2 A worst-case scenario has been considered in examining the potential impact of the development on local air quality. Given the very low levels of NO₂ and PM₁₀ across and close to the site currently, the impact of the development on local air quality is not expected to be significant in air quality terms. However, in accordance with local guidance, it is proposed that a detailed damage cost assessment and mitigation scheme be provided at reserved matters stage.

Appendices

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Glossary of Terms

AADT Annual Average Daily Traffic flow

Air Quality Standard Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health and the environment

Air Quality Objective Pollutant Objectives incorporate future dates by which a standard is to be achieved, taking into account economic considerations, practicability and technical feasibility

Annual Mean A mean pollutant concentration value in air which is calculated on a yearly basis, yielding one annual mean per calendar year. In the UK air quality regulations, the annual mean for a particular substance at a particular location for a particular calendar year is:

(a) in the case of lead, the mean of the daily levels for that year;

(b) in the case of nitrogen dioxide, the mean of the hourly means for that year;

(c) in the case of PM_{10} , the mean of the 24-hour means for that year.

Annoyance (Dust) Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance.

AQAP Air Quality Action Plan

AQEG Air Quality Expert Group

AQMA Air Quality Management Area

AQMP Air Quality Management Plan

AQO Air Quality Objective

AQS Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Background Concentrations The term used to describe pollutant concentrations which exist in the ambient atmosphere, excluding local pollution sources such as roads and stacks

CO Carbon monoxide

Construction Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.

Construction Impact Assessment An assessment of the impacts of demolition, earthworks, construction and trackout. In this Guidance, specifically the air quality impacts.

Defra Department for Environment, Food and Rural Affairs

Demolition Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.

Deposited Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.

DMRB Design Manual for Roads and Bridges

DMP Dust Management Plan; a document that describes the site-specific methods to be used to control dust emissions.

Dust Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this guidance the term 'dust' has been used to include the particles that give rise to soiling, and to other human health and ecological effects. Note: this is different to the definition given in BS 6069, where dust refers to particles up to 75 µm in diameter.

Earthworks Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.

Effects The consequences of the changes in airborne concentration and/or dust deposition for a receptor. These might manifest as annoyance due to soiling, increased morbidity or morality due to exposure to PM₁₀ or PM_{2.5} or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in EIA regulations. The opposite is an insignificant effect. In the context of construction impacts any effect will usually be adverse, however, professional judgement is required to determine whether this adverse effect is significant based in the evidence presented.

EPAQS Expert Panel on Air Quality Standards

EPUK Environmental Protection UK

HDV Heavy Duty Vehicle

Impacts The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.

LAQM Local Air Quality Management

LDF Local Development Framework

LDV Light Duty Vehicle

Mg/m³ Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m³ means that one cubic metre of air contains one microgramme (millionth of a gramme) of pollutant

NO₂ Nitrogen Dioxide

NOx A collective term used to represent the mixture of nitrogen oxides in the atmosphere, as nitric oxide (NO) and nitrogen dioxide (NO₂)

NPPF National Planning Policy Framework

Nuisance The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law:

Statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended from time to time).

Private nuisance, arising from substantial interference with a person's enjoyment and us of his land.

Public nuisance, arising from and act or omission that obstructs, damages or inconveniences the right of the community.

Each of these applying in so far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.

Note: as nuisance has a specific meaning in environmental law, and to avoid confusion, it is recommended that the term is not used in a more general sense.

PM_{2.5} The fraction of particles with a mean aerodynamic diameter equal to, or less than, 2.5 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM_{2.5}, EN 14907, with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter

 PM_{10} The fraction of particles with a mean aerodynamic diameter equal to, or less than, 10 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM₁₀, EN 12341, with a 50% efficiency cut-off at 10 µm aerodynamic diameter

RSS Regional Spatial Strategy

Running Annual Mean A mean pollutant concentration value in air which is calculated on an hourly basis, yielding one running annual mean per hour. The running annual mean for a particular substance at a particular location for a particular hour is the mean of the hourly levels for that substance at that location for that hour and the preceding 8759 hours

Trackout The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

