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1 Introduction

1.1.1 Air Quality Assessments Ltd (AQA) has been commissioned by The Corsham School, The Tynings, Corsham, SN13 9DF to undertake an air quality assessment for two proposed biomass boilers in the school grounds. There is a risk that emissions from the proposed boilers may have an impact on air quality at local receptors, including those within the school.

1.1.2 This report describes the existing air quality conditions in proximity to the site and assesses the likely impact that the biomass boilers will have on local air quality. The main air pollutants of concern related to biomass boiler emissions are nitrogen dioxide (NO_2) and fine particulate matter ($PM_{2.5}$ and PM_{10}).

1.1.3 The assessment has been prepared taking into account all relevant local and national guidance and regulations.

1.1.4 The references and a glossary of common air quality terminology used in this assessment are shown in **Section 10** and **Section 11** respectively.

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2 Air Quality Legislation and Policy

2.1. EU Limit Values

2.1.1 The European Union's Directive on ambient air quality and cleaner air for Europe (European Parliament, Council of the European Union, 2008) set legally binding limit values for NO_2, PM_{10} and $PM_{2.5}$. The Air Quality Standards Regulations 2010 (as amended) implement the EU Directive limit values in English legislation (The Stationary Office, 2010). Achievement of the limit values is a national obligation rather than a local one.

2.1.2 The United Kingdom left the European Union on 31st January 2020; however, the EU legislation currently remains enshrined in UK law through the Air Quality Standards Regulations.

2.1.3 The limit values for NO_2 and PM_{10} are the same as the objective values (see below). Limit values apply at all locations, apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway. The limit value compliance dates differ from the objectives; the PM_{10} and NO_2 limit value applied from 2005 and 2010 respectively, whereas the $PM_{2.5}$ limit value applied from 2020.

2.2. National Legislation

2.2.1 Part IV of The Environment Act 1995, as amended by the Environment Act 2021, required the UK Government to prepare a national Air Quality Strategy. A new Air Quality Strategy for England was published in April 2023 (Defra, 2023a). The Air Quality Strategy sets out the actions that Defra expects local authorities to take in support of long-term air quality goals, including new $PM_{2.5}$ targets, and provides a framework to enable local authorities to make the best use of their powers and make improvements for their communities.

2.2.2 The strategy sets out air quality standards and objectives intended to protect human health and the environment. Standards are the concentrations of pollutants in the atmosphere, below which there is a minimum risk of health effects or ecosystem damage; they are set with regard to scientific and medical evidence. Objectives are the policy targets set by the Government, taking account of economic efficiency, practicability, technical feasibility and timescale, where the standards are expected to be achieved by a certain date. The Government has also published a Clean Air Strategy, which provides an overview of the actions that the government will take to improve air quality (Defra, 2019). The actions in the Clean Air Strategy focus on emissions from transport, the home, farming, and industry.

2.2.3 The Air Quality Strategy also describes the system of Local Air Quality Management (LAQM), which was introduced in Part IV of the Environment Act 1995. LAQM requires every local authority to carry out regular review and assessments of air quality in its area. Where an objective has not been, or is unlikely to be achieved, the local authority must declare an Air Quality Management Area (AQMA) and prepare an action plan which sets out appropriate measures to be introduced in pursuit of the objectives. $PM_{2.5}$ is not included in the LAQM framework; however, the government

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expects all local authorities to effectively use their powers to reduce $PM_{2.5}$ emissions from the sources which are within their control.

2.2.4 The objectives for NO_2 and PM_{10}, as prescribed by the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002 (The Stationary Office, 2000; The Stationary Office, 2002), are shown in **Table 1**. The objectives for PM_{10} and NO_2 were to have been achieved by 2004 and 2005 respectively and continue to apply in all future years thereafter.

2.2.5 The air quality standard for $PM_{2.5}$, also shown in **Table 1**, was to be achieved by 2020. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 set out two legally binding targets for $PM_{2.5}$, with interim targets for each set out in the Environmental Improvement Plan 2023 (The Stationery Office, 2023; Defra, 2023b). The $PM_{2.5}$ targets are:

- 10µg/m^3 annual mean concentration $PM_{2.5}$ nationwide by 2040, with an interim target of 12µg/m^3 by January 2028; and
- 35% reduction in average population exposure by 2040, with an interim target of a 22% reduction by January 2028, both compared to a 2018 baseline.

Table 1: The Objectives for NO_2 and PM_{10} and the $PM_{2.5}$ Standard

Pollutant	Concentration Measured As	Objective/Standard
NO_2	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
PM_{10}	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
$PM_{2.5}$	Annual Mean	20 µg/m^3

2.2.6 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. Examples of where the objectives should apply are provided in the Local Air Quality Management Technical Guidance (Defra, 2022) issued by the Department for Environment, Food and Rural Affairs (Defra). The annual mean NO_2 and PM_{10} objectives should apply at the building façades of residential properties, schools, hospitals, care homes etc.; they should not apply at the building façades of places of work, hotels, gardens or kerbside sites. The 24-hour mean PM_{10} objective should apply at all locations where the annual mean objective applies, as well as the gardens of residential properties and hotels. The 1-hour mean NO_2 objective should apply at all locations where the annual and 24-hour mean objectives apply, as well as at kerbside sites where the public have regular access, e.g., the pavements of busy shopping streets.

2.3. Planning Policy

National Policies

2.3.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied (Department for Levelling Up, Housing and Communities, 2021). It provides a framework within which locally prepared plans for development can be produced. At Paragraph 8c, the NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development and includes an overarching environmental objective:

"To protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

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

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

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

2.3.3 The NPPF also states at Paragraph 174 that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

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

2.3.4 The NPPF goes on to state at Paragraph 185:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

2.3.5 With specific reference to air quality, the NPPF states at Paragraph 186 that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic

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approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.3.6 The NPPF also includes the following statement at Paragraph 188:

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

2.3.7 The NPPF is supported by Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities, 2019). The PPG states that:

"The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified."

2.3.8 The PPG goes on to state that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity."

2.3.9 The PPG also sets out the information that may be required in an air quality assessment, stating that:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific."

2.3.10 It also provides guidance on options for mitigating air quality impacts, and makes clear that:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact."

Local Policies

2.3.11 The Wiltshire Core Strategy includes Core Policy 55 Air Quality, which states (Wiltshire Council, 2015):

"Development proposals, which by virtue of their scale, nature or location are likely to exacerbate existing areas of poor air quality, will need to demonstrate that measures can be taken to effectively mitigate emission levels in order to protect public health, environmental quality and amenity. Mitigation measures should demonstrate how they will make a positive contribution to the aims of the Air Quality Strategy for Wiltshire and where relevant, the Wiltshire Air Quality Action Plan. Mitigation may include:

i. landscaping, bunding or separation to increase distance from highways and junctions;

ii. possible traffic management or highway improvements to be agreed with the local authority;

iii. abatement technology and incorporating site layout/separation and other conditions in site planning;

iv. traffic routing, site management, site layout and phasing;

v. where appropriate, contributions will be sought toward the mitigation of the impact a development may have on levels of air pollutants."

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3 Methodology

3.1. Existing Conditions

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

- The results of monitoring and the most recent publicly available Air Quality Annual Status Reports (ASR) published by Wiltshire Council (Wiltshire Council, 2022); and
- Background pollutant concentration maps published by Defra (Defra, 2023c).

3.2. Biomass Boiler Impacts

Modelling Methodology

3.2.1 Concentrations have been predicted using the ADMS 5 dispersion model v6.0.0.1 (CERC, 2023). ADMS 5 is an extensively validated new generation Gaussian plume air dispersion model, and is used by regulators, government departments, consultancies and industry. The model is able to simulate the entrainment of the plume in the wake of the building.

3.2.2 The model has been run to predict the contribution of biomass boiler emissions to annual mean nitrogen oxides and PM concentrations and the 99.79th percentile of 1-hour mean nitrogen oxides concentrations.

Sensitive Locations

3.2.3 Concentrations have been predicted across a 1km by 1km grid with a 10m resolution (see **Table 2**). Kriging has been used to interpolate a final grid spacing of 2m to produce concentration isopleths.

Table 2: Grid Settings used in ADMS5

Grid	Start	Finish	Number of Points
x	386215	387215	100
y	169724	170724	100
z	1.5	1.5	1

Model Input Parameters

3.2.4 Details of the flue height and location and plans of the building housing the boiler have been taken from documents provided by the applicant. Operating parameters for the biomass boilers have been taken from the test report undertaken as part of the validation of the boiler performance requirements of DIN EN 303-5. The model input parameters for the boilers are shown in **Table 3**, with the flue locations shown in **Figure 1**.

3.2.5 Particle emissions in the test report have been provided for dust only; therefore, it has been assumed that the dust makes up 100% of the PM_{10} and 100% of the $PM_{2.5}$ emissions. This approach provides a conservative assessment.

3.2.6 The biomass boilers will operate for 1,610 hours a year, and the emissions for predicting the impact on annual mean concentrations have been factored by 0.18 to account for this.

3.2.7 To ensure that all meteorological hours are included in the assessment, the assessment of the impact on 1-hour mean NO_2 concentrations assumes operations of 24 hours a day, 365 days a year.

3.2.8 To provide a conservative assessment, it has been assumed that both biomass boilers will operate at full capacity at the same time. In reality, the biomass boilers will operate at a range of capacities depending on the demand for heat and hot water. One boiler will operate at 67% to 100% of capacity and the other boiler will operate at 0% to 78% of capacity, depending on the time of year. Emissions are lower from biomass boilers operating at less than full capacity.

3.2.9 Entrainment of the plume into the wake of the building (the building downwash effect) has been simulated within the model. The building housing the plant has been included as the main building, with a height of 2.5m, and nearby school buildings have been included, as shown in **Figure 1**.

Table 3: Model Input Parameters used in ADMS 5

Parameter		Value
Make and model		ETA HACK VR 463kW
Fuel		Wood chip
Heat Input (kW_{th})		531.8
Exhaust gas volumetric flow rate (Nm^3/s) [a]		0.234
Exhaust gas temperature (°C)		122
Flue diameter (m) [b]		0.3
Flue height above ground (m)		3.5
Flue height above roof (m)		1
NOx emission rate	mg/Nm^3 [c]	131
	g/s	0.031
PM emission rate	mg/Nm^3 [c]	13
	g/s	0.003

a Calculated from a flue gas mass flow of 302 g/s, normalised to 0°C, 101.3 kPa, 0% water, 10%O_2.
b Estimated from the internal diameter of the boiler flue tube connector.
c Normalised to normalised to 0°C, 101.3 kPa, 0% water, 10%O_2.



Figure 1: Biomass Boiler Flues and Buildings Included in the Model
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Meteorological Data

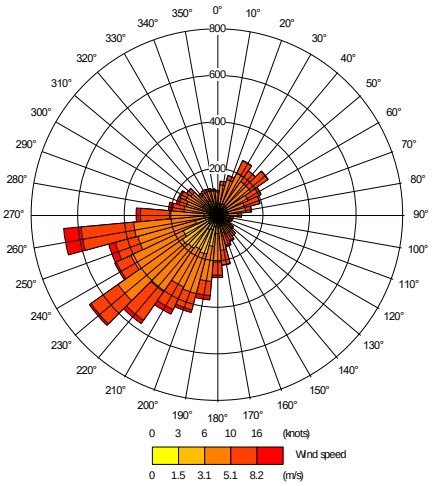
3.2.10 The model has been run using 5 years of hourly sequential meteorological data from the meteorological station operated at Lyneham, which is approximately 16km to the northeast of the application site.

3.2.1 The model has been run for each meteorological year (2015, 2016, 2017, 2018 and 2019) and the predicted worst-case concentration at each grid point used for the assessment. A wind rose for each meteorological year is shown in **Figure 2**. Other model inputs relating to meteorology are shown in **Table 4**. The ADMS 5 default values were used for surface albedo and the Priestly-Taylor parameter.

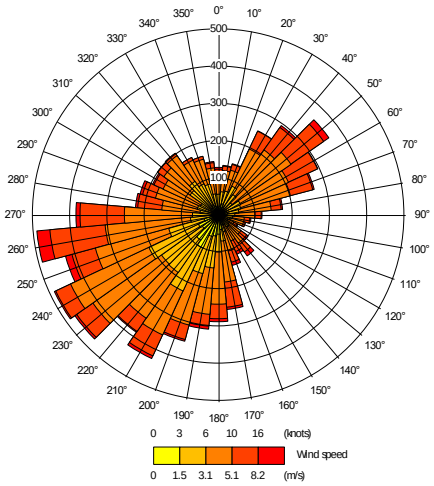
3.2.2 The surrounding area is relatively flat; therefore, the effects of complex terrain were not included in the model.

Table 4: Model Meteorological Input Parameters used in ADMS 5 [a]

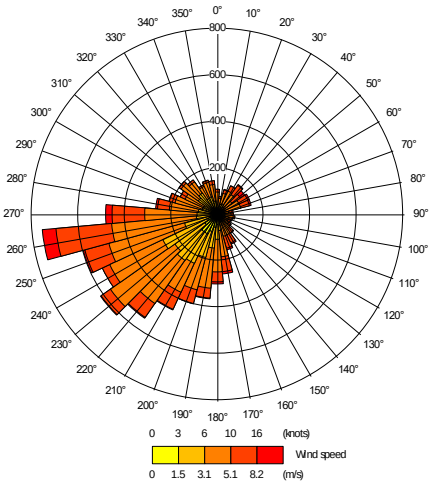
Parameter		Value
Monin-Obukhov Length (m)	Dispersion Site	10
	Met Measurement Site	10
Surface Roughness (m)	Dispersion Site	0.5
	Met Measurement Site	0.005



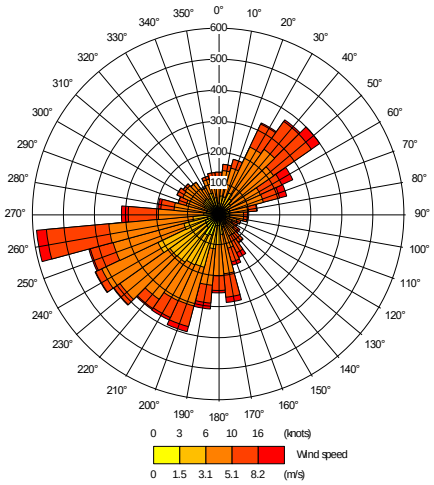
2015



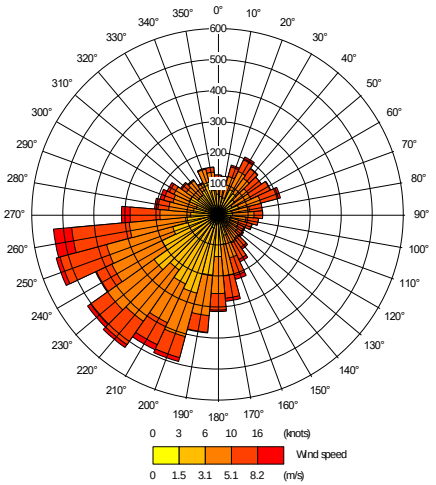
2016



2017



2018



2019

Figure 2: Wind Rose for Lyneham

Post-processing

3.2.3 The approach recommended by the Environment Agency has been used to adjust the model output of NOx to nitrogen dioxide as follows (Environment Agency, 2005; Environment Agency and Defra, 2021):

- annual mean nitrogen dioxide concentration = annual mean nitrogen oxides x 0.7; and
- 99.79th percentile of 1-hour mean nitrogen dioxide concentrations = 99.79th percentile of 1-hour mean nitrogen oxides x 0.35.

3.3. Assessment Criteria and Significance

3.3.1 There is no official guidance in the UK on how to describe air quality impacts, nor how to assess their significance. The approach suggested by Environmental Protection UK (EPUK) and the IAQM in guidance on Land-Use Planning & Development Control: Planning for Air Quality (EPUK and IAQM, 2015) has been used for this assessment. The air quality impacts have been described by determining the percentage change in concentrations relative to an air quality assessment level (AQAL) and comparing this with the total long-term average concentration, as set out in **Table 5**.

3.3.2 The AQAL for annual mean NO_2 is 40µg/m^3, based on the annual mean objective. The AQAL for 1-hour mean NO_2 concentrations is 200µg/m^3, based on the 1-hour mean objective.

3.3.3 The AQAL for PM_{10} is an annual mean concentration of 32µg/m^3 as measured data show that the 24-hour PM_{10} objective could be exceeded where annual mean concentrations are above 32µg/m^3 (Defra, 2022).

3.3.4 The AQAL for $PM_{2.5}$ is a 20µg/m^3, based on the annual mean air quality standard. The legally binding $PM_{2.5}$ target value of 10µg/m^3 does not need to be achieved until 2040 and guidance on how to assess progress towards the target value has yet to be published. An assessment of whether the proposed development would hinder progress towards the target value has been undertaken based on the 20µg/m^3 annual mean standard and the 12µg/m^3 2028 interim annual mean target. Assuming a linear reduction, annual mean $PM_{2.5}$ concentrations would need to fall by 1µg/m^3/year in order to achieve the 2028 interim target value from the 2020 standard. Therefore, predicted $PM_{2.5}$ concentrations have also been compared with a 2023 annual mean $PM_{2.5}$ assessment target of 17µg/m^3.

3.3.5 With regard to impacts on short-term concentrations, the approach outlined in the EPUK/IAQM guidance has been used, where a short-term process contribution of 10-20% of the relevant standard is considered to be of small magnitude, 20-50% of medium magnitude and above 50% of large magnitude, with the severity of the impact described as slight, moderate or substantial respectively. The EPUK/IAQM guidance goes on to state that:

"In most cases, the assessment of impact severity for a proposed development will be governed by the long-term exposure experienced by receptors and it will not be a necessity to define the significance of effects by reference to short-term impacts. The severity of the impact will be substantial when there is a risk that the relevant AQAL

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for short-term concentrations is approached through the presence of the new source, taking into account the contribution of other prominent local sources."

Table 5: Impact Descriptors for Individual Receptors

Long-term Average Concentration at Receptor in Assessment Year [b]	% Change in Concentration Relative to AQAL [a]			
	1	2-5	6-10	>10
≤ 75% of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
≥ 110% of AQAL	Moderate	Substantial	Substantial	Substantial

a The % change rounded to a whole number. Changes of 0%, i.e., less than 0.5%, are described as negligible.
b The without scheme concentration where there is a decrease in predicted concentrations, and the with scheme concentration where there is an increase in predicted concentrations.

3.3.6 The air quality impact, i.e., the change in concentrations as a result of the proposed development, may have an effect on human health, dependent on the severity of the impact and other factors.

3.3.7 The IAQM guidance advises that the overall effect of the air quality impacts should be judged as either significant or not significant taking account of:

- The descriptions of the predicted impacts;
- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts;
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- The potential for cumulative impacts, i.e., several slight impacts taken together could have a significant effect, or a moderate or substantial effect confined to a small area and not obviously a cause of harm to human health could be described as not significant; and
- The consequences of the impacts, i.e., will the impacts have an effect on human health that can be considered significant? The impacts from an individual development would usually not be large enough to result in a measurable change in health outcomes regarded as significant by healthcare professionals, and therefore the impact on local air quality is used as a proxy for assessing effects on health.

3.3.8 The judgement of significance should be made by a competent, suitably qualified professional, and the professional experience of the consultant preparing the report is set out in **Appendix A1**.

3.4. Uncertainty

3.4.1 There are many factors that contribute to uncertainty when predicting pollutant concentrations. The emission factors utilised in the air quality model will have inherent uncertainties associated with them and there are also uncertainties associated with the model itself, which simplifies real world conditions into a series of algorithms. The use of the extensively validated ADMS 5 dispersion model will reduce these uncertainties.

3.4.2 The use of five years of meteorological data, with the worst case predicted concentration at each grid point used for the assessment, reduces uncertainty with regards meteorological conditions.

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4 Baseline Conditions

4.1. LAQM Review and Assessment

4.1.1 Wiltshire Council has declared eight AQMAs for exceedances of the annual mean NO_2 objective; however, no AQMAs have been declared in Corsham and the closest AQMA is located approximately 10km from the application site.

4.1.2 Wiltshire Council has concluded that the air quality objectives for PM_{10} are achieved in its area.

4.2. Local Air Quality Monitoring

4.2.1 Wiltshire Council currently operates four automatic monitoring sites and an NO_2 diffusion tube monitoring network. None of the automatic monitoring sites are located in Corsham; however, data from three diffusion tube monitoring sites are available and are provided in **Table 6**, with the monitoring site locations shown in **Figure 3**.

4.2.2 Measured annual mean NO_2 concentrations in Corsham ranged from 9.1 to 25.1 µg/m^3 between 2018 and 2021; however, data from two of the sites is only available for 2021. No exceedances of the annual mean objective have been measured. Measurements across the UK have shown that there is a risk of exceedances of the 1-hour mean NO_2 objective where the annual mean concentration is above 60 µg/m^3; therefore, it is highly unlikely that the 1-hr mean objective has been exceeded in Corsham (Defra, 2022).

4.2.3 Measured concentrations in 2020 and 2021 would have been affected by travel restriction brought in to control the Covid-19 pandemic and may not be representative of the usual air quality.

Table 6: Measured Annual Mean NO_2 Concentrations

Site ID	Location	Site Type [a]	Annual Mean (µg/m^3)			
			2018	2019	2020	2021
42	Charles St, Corsham	UB	12.3	10.2	9.1	9.3
43	Pickwick, Corsham	R	-	-	-	25.1
44	Corsham Town Centre	R	-	-	-	15.3
Objective			**40**			

a R = Roadside, UB = Urban Background.

4.3. Background Concentrations

4.3.1 Estimated background concentrations at the application site are shown in **Table 7**. The background concentrations have been derived from data in the national maps published by Defra. The background concentrations are well below the objectives/standards.

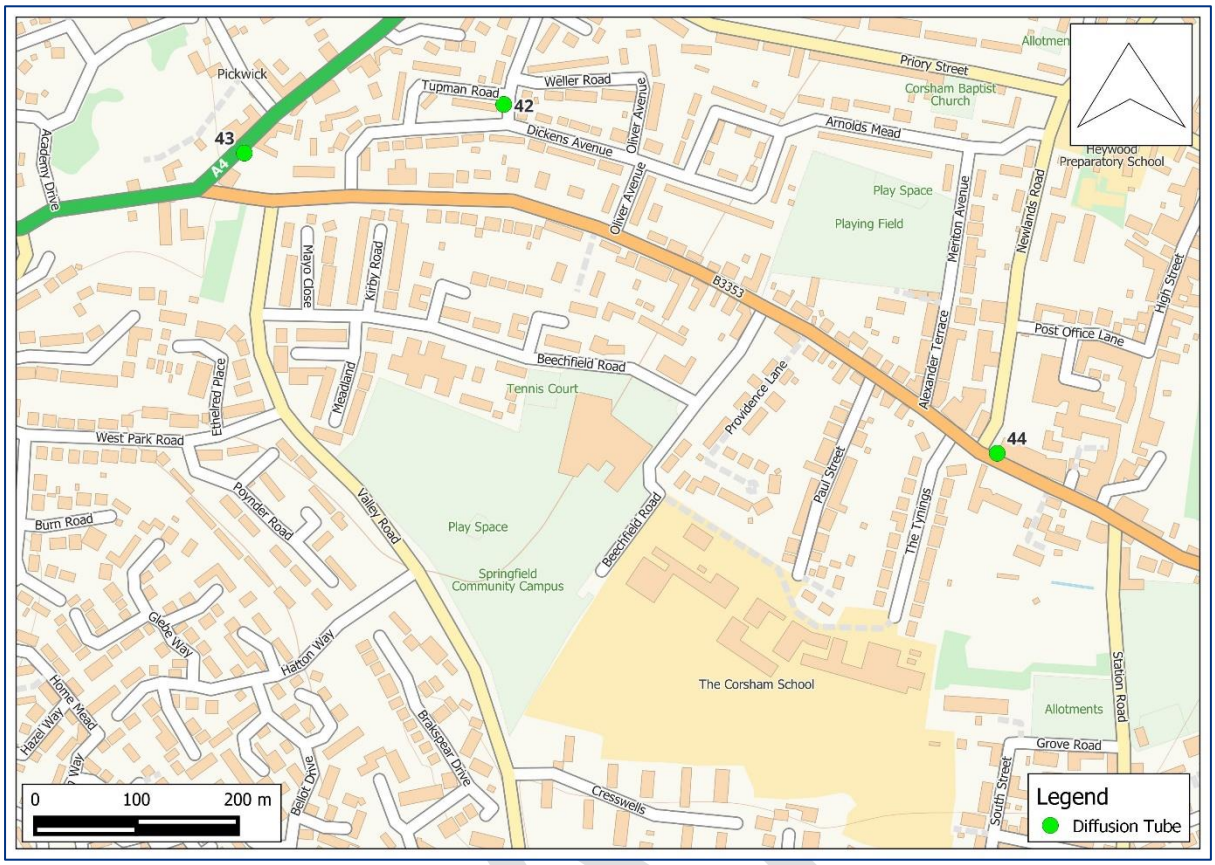

Figure 3: Air Quality Monitoring Sites
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Table 7: Estimated Annual Mean Background Concentrations 2023 (µg/m³)

Grid	NO_2	PM_{10}	$PM_{2.5}$
426500,130500	7.5	12.4	8.3
Objective/Standard	**40**	**40**	**20**

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5 Impact Assessment

5.1. Nitrogen Dioxide

Annual Mean

5.1.1 The isopleths in **Figure 4** show annual mean process contribution concentrations at 1%, 5% and 10% of the AQAL for NO_2, which represents the change in concentration relative to the AQAL.

5.1.2 There are no receptors relevant to the annual mean NO_2 objective within the 5% isopleth; therefore, no receptors will be exposed to an increase in annual mean NO_2 concentrations of more than 2µg/m^3.

5.1.3 Given the distance from any significant road traffic sources, the long-term annual mean NO_2 concentration within the area between the 1% and 5% isopleths is likely to be similar to that measured at diffusion tube monitoring site 42, i.e., 9.1-12.3µg/m^3.

5.1.4 With the background concentration added to the process contribution, the annual mean NO_2 concentration within the area between the 1% and 5% isopleths would be no more than 14.3µg/m^3. Therefore, with regard to the impact descriptors in **Table 5**, the impact on annual mean NO_2 concentrations is described at negligible.

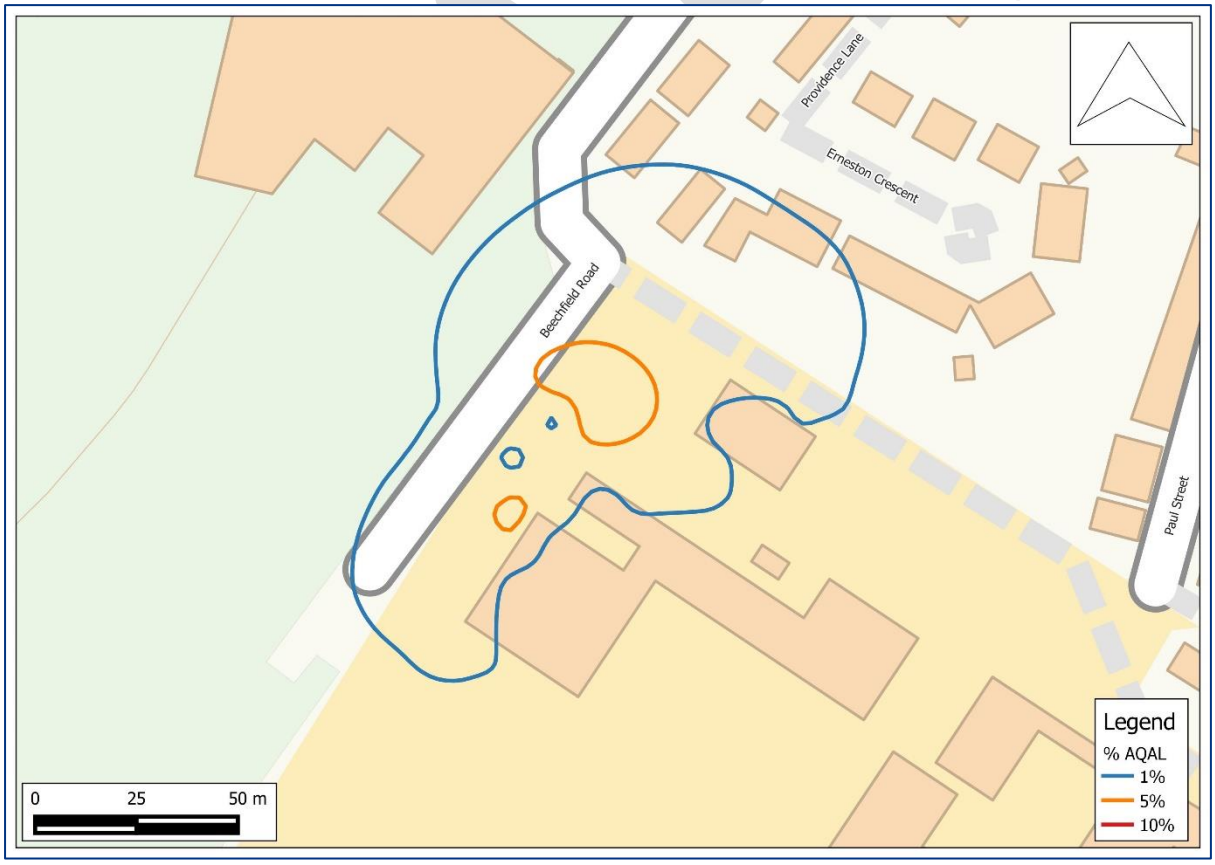

Figure 4: Annual Mean NO_2 Process Contributions as a Percentage of AQAL
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1-hour Mean

5.1.5 The isopleths in **Figure 5** show process contribution concentrations at 10%, 20% and 50% of the AQAL for 1-hour mean NO_2 concentrations. The façade of the school building lies within an area where the process contribution results in an increase of between 20-50% of the 1-hour mean NO_2 AQAL. In accordance with the EPUK/IAQM guidance, the impact on 1-hour mean NO_2 concentrations would be described as of medium magnitude, which would correspond with a moderate impact.

5.1.6 It should be noted that the assessment of the impact on 1-hour mean NO_2 concentrations assumes both biomass boiler plant operating at full load 24-hours a day, 365 days a year; therefore, the assessment is extremely conservative. In reality, given the very low background concentrations of NO_2 and the distance of the affected area from any other emissions sources, it is extremely unlikely that the proposed development will cause 1-hour mean NO_2 concentrations to come close to the objective value of 200µg/m^3. In accordance with the EPUK/IAQM guidance, the significance of effects on NO_2 have been defined based on the impacts on annual mean concentrations.



Figure 5: NO_2 99.79th %ile 1-hour Process Contributions as a Percentage of AQAL
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5.2. Particulate Matter

PM_{10}

5.2.1 The isopleths in **Figure 6** show annual mean process contribution concentrations at 1%, 5% and 10% of the AQAL for PM_{10}, which represents the change in concentration relative to the AQAL.

5.2.2 There are no receptors relevant to the annual mean or 24-hour mean PM_{10} objectives in the area between the 1% and 5% isopleths; therefore, the impact on PM_{10} is described as negligible.

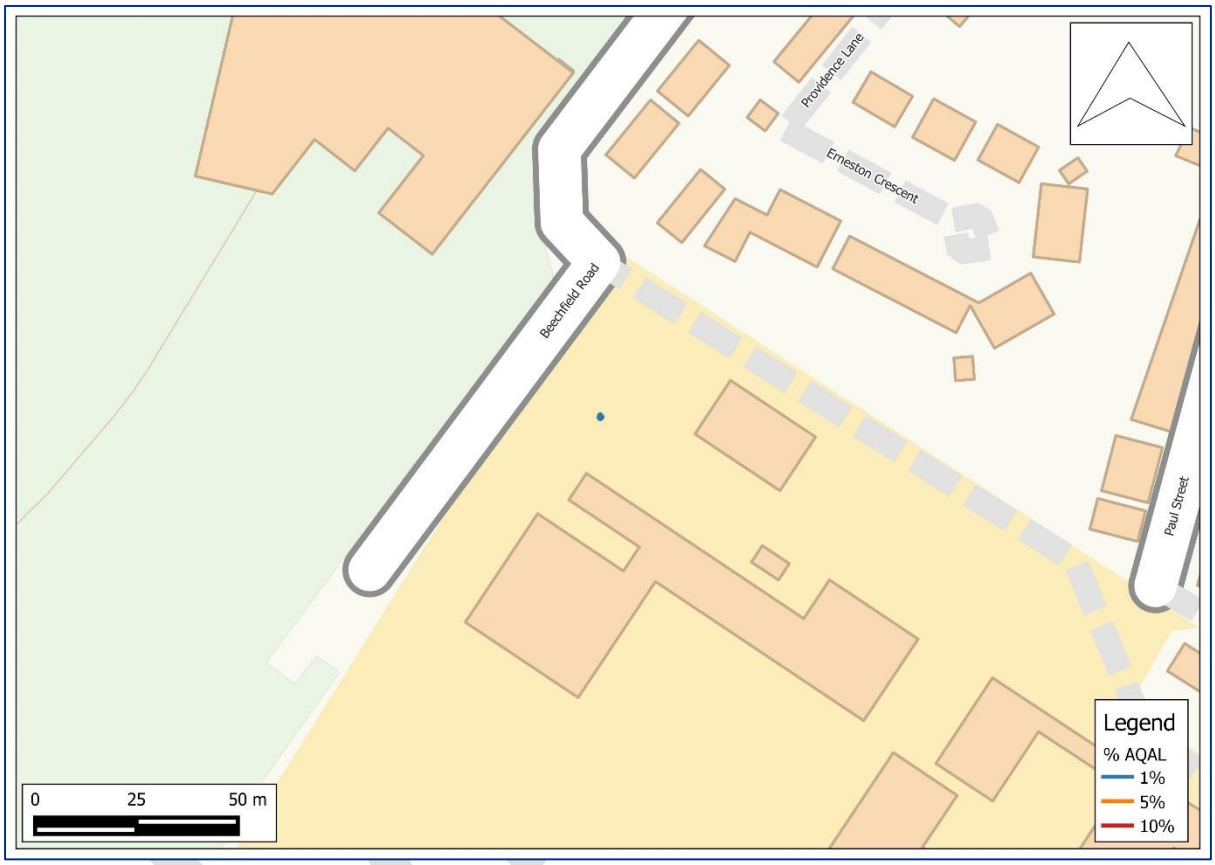

Figure 6: Annual Mean PM_{10} Process Contributions as a Percentage of AQAL
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$PM_{2.5}$

5.2.3 The isopleths in **Figure 7** show annual mean process contribution concentrations at 1%, 5% and 10% of the AQAL for $PM_{2.5}$, which represents the change in concentration relative to the AQAL.

5.2.4 The façade of the school building lies within an area where the process contribution results in an increase of between 1-5% of the annual mean $PM_{2.5}$ AQAL, therefore, no receptors will be exposed to an increase in annual mean $PM_{2.5}$ concentrations of more than 1µg/m^3.

5.2.5 Given the distance from any significant road traffic sources, the long-term annual mean $PM_{2.5}$ concentration within the area between the 1% and 5% isopleths is likely to be close to the background level, i.e., 8.3µg/m^3.

5.2.6 With the background concentration added to the process contribution, the total annual mean $PM_{2.5}$ concentration within the area between the 1% and 5% isopleths would be no more than 9.3µg/m^3. Therefore, with regard to the impact descriptors in **Table 5**, the impact on annual mean $PM_{2.5}$ concentrations is described at negligible.

5.2.7 The predicted total annual mean $PM_{2.5}$ concentrations are all below the assessment target value of 17µg/m^3; therefore, the proposed development would not hinder progress towards the 2028 12µg/m^3 interim target.

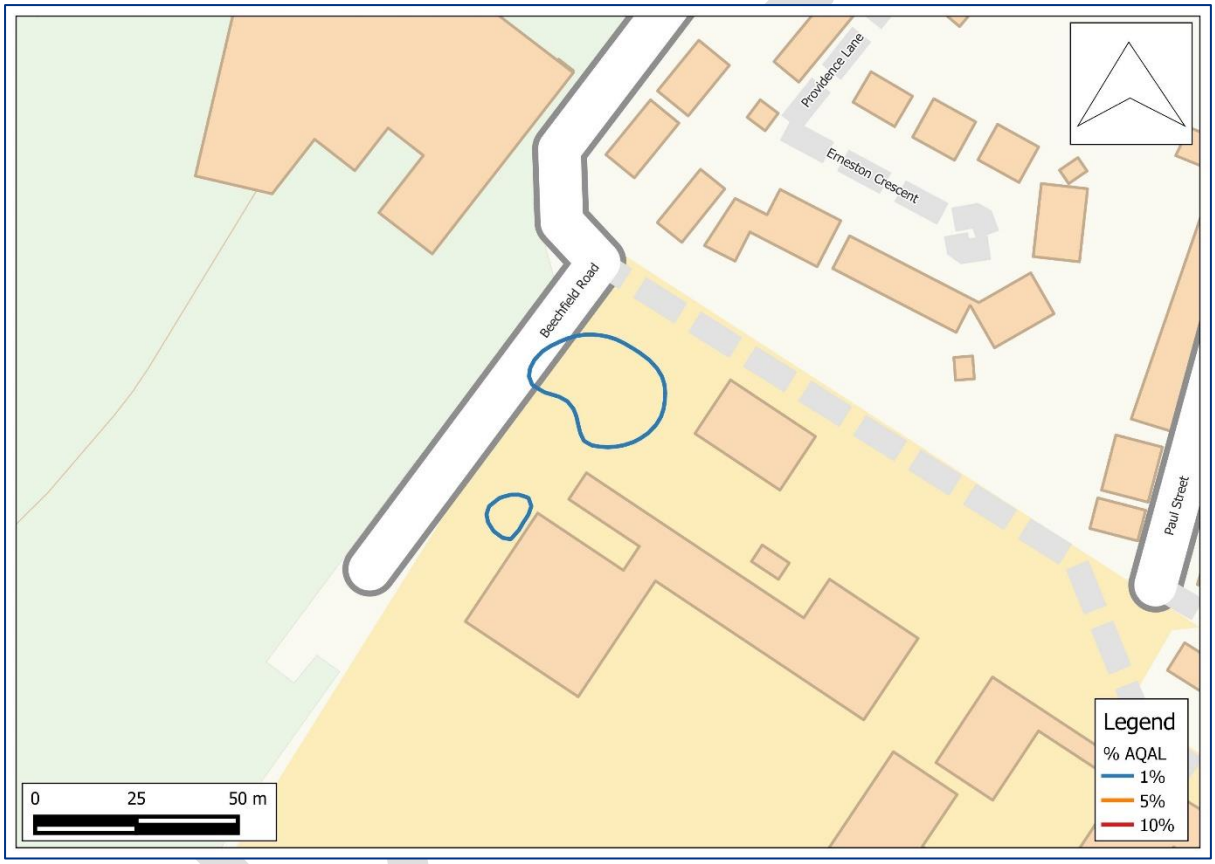

Figure 7: Annual Mean $PM_{2.5}$ Process Contributions as a Percentage of AQAL
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5.3. Significance of Effects

5.3.1 The operation of the proposed biomass boilers would have a negligible impact on local air quality; therefore, it is considered that the effect of the proposed development on local air quality is insignificant.

6 Mitigation

6.1.1 The assessment has demonstrated that the scheme will have a negligible effect on local air quality and would risk any exceedances of the air quality objectives; therefore, it is not considered appropriate to propose mitigation measures for this scheme.

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7 Residual Impacts

7.1.1 The residual impacts will be the same as those identified in **Section 5**.

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8 Conclusions

8.1.1 The operational impacts due to emissions from the proposed biomass boilers at The Corsham School have been assessed.

8.1.2 The impacts due to emissions from the biomass boilers have been shown to be negligible. Overall, it is judged that the air quality impacts due to the operation of the biomass boilers will not be significant. This conclusion is based on the following:

- The impacts on annual mean concentrations being described as negligible where there is relevant exposure;
- Predicted total concentrations remaining well below the AQALs;

8.1.3 The air quality effects of the proposed development have been assessed and found to be insignificant. There should be no constraints to the use of biomass boilers at the site, with regard to air quality, as the proposed development is consistent with the relevant parts of:

- the NPPF and PPG; and
- Core Policy 55 of the Wiltshire Core Strategy.

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10 Glossary

ADMS 5	Atmospheric Dispersion Modelling System
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
EPUK	Environmental Protection UK
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
µg/m^3	Microgrammes per cubic metre
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

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11 Appendices

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A1 Professional Experience

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

Bob Thomas is a Director at AQA, with over twenty years working in the sciences and fifteen years' experience in the field of air quality management and assessment. He has carried out air quality assessments for a wide range of developments, including residential, commercial, industrial, minerals and waste developments. He has been responsible for air quality projects that include ambient air quality monitoring of nitrogen dioxide, dust and PM_{10}, the assessment of nuisance odours and dust, and the preparation of Review and Assessment reports for local authorities. He has extensive dispersion modelling experience for road traffic, energy centre and industrial sources, and has completed many stand-alone reports and chapters for inclusion within an Environmental Statement. Bob has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers, architects and process operators, and has provided expert witness services at public inquiry. He is a Chartered Scientist, a Member of the Institute of Air Quality Management and a Member of the Institution of Environmental Sciences.

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

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