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GLENFARROW UK LTD

AIR QUALITY ASSESSMENT

BEAMGLOW, SOMERSHAM ROAD, ST IVES PE27 3LP

Client: Glenfarrow UK Ltd

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1 INTRODUCTION

1.1 Introduction to Assessment

1.1.1 By instruction from Glenfarrow UK Ltd, NoiseAir Limited was commissioned to undertake an Air Quality Assessment (AQA) in support of the installation of a Heizomat RHK-AK 150 - RHK-AK 400 Wastewood biomass boiler (Certificate EN 14961 P4079 C001) at Beamglow, Somersham Road, St Ives PE27 3LP, herein referred to as 'the Site'.

1.1.2 Combustion emissions from the proposed plant and Site traffic have the potential to cause air quality impacts during normal operation. As such an AQA was undertaken in order to determine baseline conditions and consider potential effects.

1.1.3 Limitations of this report are outlined in **Appendix A**.

1.2 Site Location and Context

1.2.1 The Site is located off Somersham Road, St Ives PE27 3LP, at approximate National Grid Reference (NGR): 532100, 272550. **Figure 1** details the location of the Site.

1.2.2 It is understood that planning permission was granted for the installation of a proposed biomass boiler at the Site, but the specific model of boiler to be installed has changed and the local council would like confirmation that the new model is compliant with relevant air quality legislation. The boiler will operate as and when required and thus for the purposes of this assessment, it has been modelled as operating 24 hours a day 7 days a week, as when it is required it could operate continually for short periods of time. Combustion emissions from the plant will be released at a height of 11.3m via a single 0.35m wide dispersion stack.

1.2.3 The Site is located within an established industrial estate, where local air quality may be influenced by emissions from existing industrial and commercial activities, including vehicle movements and industrial processes. The Proposed Development has the potential to result in additional emissions of nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) from plant exhaust emissions during operation, which may affect nearby sensitive receptors. An AQA is therefore required to assess the potential air quality impacts associated with the Proposed Development in accordance with the requirements of the National Planning Policy Framework (NPPF). The assessment will consider the potential impacts of emissions of nitrogen dioxide (NO_2), and particulate matter (PM_{10} and $PM_{2.5}$) from the proposed plant on existing air quality at nearby sensitive receptors.

1.2.4 The Proposed Development is located within the authority of Huntingdonshire District Council (HDC). The Site is on the eastern edge of Somersham Road Industrial Estate, to

north of St Ives town centre. Surrounding the Site are other industrial/commercial uses associated with the Somersham Road Industrial Estate. Due to the Site being located on an industrial estate, the predominant land use in the area is a mix of industrial and commercial premises, with the closest sensitive receptors being residential dwellings to the south on Russet Close and to the west on Dart Close.

1.2.5 The report presents the findings of an assessment of the potential air quality impacts of the Proposed Development during the operational phase, with the source type and significance of potential impacts identified.

1.2.6 A glossary of terms used in this report is provided in **Appendix B**.

2 LEGISLATION AND POLICY

2.1 Air Quality Legislation and Policy

2.1.1 A summary of the relevant air quality legislation and policy is provided below.

UK Air Quality Strategy

2.1.2 The government's policy on air quality within England is set out in the Air Quality Strategy for England (AQS), with the latest framework for Local Authority delivery within England published in 2023[1].

2.1.3 The AQS provides a framework for reducing air pollution in England with the aim of meeting the requirements of European Union Legislation, and fulfils the statutory requirement of the Environment Act 1995 as amended by the Environment Act 2021, to publish an Air Quality Strategy setting out air quality standards, objectives, and measures for improving ambient air quality every 5 years. The AQS sets Air Quality Objectives (AQOs) for seven key pollutants to protect human health. These are benzene (C_6H_6), 1,3 butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10}) and sulphur dioxide (SO_2).

2.1.4 The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organization (WHO) with regards to current scientific knowledge and the effects of each pollutant on health and the environment.

2.1.5 The AQOs are medium-term policy-based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to EPAQS recommended standards or WHO guideline limits, whereas other involve a margin of tolerance, i.e. a limited number of permitted exceedances of standards over a given period.

2.1.6 $PM_{2.5}$ is not currently part of the Local Air Quality Management framework and therefore does not have any associated AQOs. However, the Air Quality Standards Regulations 2010 establish an annual mean limit value of 20 µg/m³ for $PM_{2.5}$. In addition, the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 establish two legally binding targets for England to be achieved by 31 December 2040:

- a maximum annual mean $PM_{2.5}$ concentration of 10 µg/m³; and

[1] Department for Environment, Food and Rural Affairs (Defra, 2023) Policy paper Air quality strategy: framework for local authority delivery.

- a reduction in average population exposure to $PM_{2.5}$ of at least 35% relative to a 2018 baseline.

2.1.7 The Environmental Improvement Plan 2025[2] establishes updated interim targets of a maximum annual mean $PM_{2.5}$ concentration of 10 µg/m³ and a 30% reduction in average population exposure relative to 2018, both to be achieved by December 2030. The population exposure targets apply at the national level and are therefore not directly applicable as site-specific assessment criteria.

2.1.8 **Table 1** presents the AQOs, limit value and interim target for pollutants considered within this assessment.

Table 1: National Air Quality Objectives and European Directive Limit Values for the Protection of Human Health

Pollutant	Applies to	Objective/Interim Target	Measured As
NO_2	England	40 µg/m^3	Annual mean
	England	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
PM_{10}	England	40 µg/m^3	Annual mean
	England	50 µg/m^3 not to be exceeded more than 35 times a year	24-hour mean
$PM_{2.5}$	England	20 µg/m³ limit value	Annual mean
	England	Interim target of 10 µg/m^3 by December 2030	Annual mean

2.1.9 For the pollutants considered in this assessment, there are both long-term (annual mean) and short-term standards. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road compared with the exposure of residential properties adjacent to a road.

2.1.10 **Table 2** summarises the advice provided in Local Air Quality Management (LAQM) technical guidance[3] on where the AQOs for pollutants considered within this report apply.

[2] Department for Environment, Food and Rural Affairs (Defra, 2025. Environmental Improvement Plan 2025.
[3] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table 2: Examples of Where the Air Quality Objectives Apply		
Pollutant	**Objective Should Apply At**	**Objective Should Not Apply At**
Annual Mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24-hour mean objectives apply Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 Environmental Assessment Levels

2.2.1 An Environmental Assessment Level (EAL) is the concentration of a substance, which, in a particular environmental medium, the regulators regard as an appropriate comparator value. This enables comparison between the environmental effects of different substances in that medium and between environmental effects in different media, enabling the summation of those effects.

2.2.2 Ideally EALs to fulfil this objective would be defined for each pollutant:

- Based on the sensitivity of particular habitats or receptors (in particular three main types of receptor should be considered, protection of human health, protection of natural ecosystems and protection of specific sensitive receptors, e.g. materials, commercial activities requiring a particular environmental quality);
- Be produced according to a standardised protocol to ensure that they are consistent, reproducible and readily understood;
- Provide similar measure of protection for different receptors both within and between media; and,
- Take account of habitat specific environmental factors such as pH, nutrient status, bioaccumulation, transfer and transformation processes where necessary.

2.3 Critical Loads and Levels

2.3.1 A critical load is defined by the UK Air Pollution Information System (APIS)[4] as:

> *"A quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge."*

2.3.2 A critical level is defined as:

> *"Concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge."*

2.3.3 A critical load refers to deposition of a pollutant, while a critical level refers to pollutant concentrations in the atmosphere (which usually have direct effects on vegetation or human health).

2.3.4 When pollutant loads (or concentrations) exceed the critical load or level it is considered that there is a risk of harmful effects. The excess over the critical load or level is termed the exceedance. A larger exceedance is often considered to represent a greater risk of damage.

2.3.5 Maps of critical loads and levels and their exceedances have been used to show the potential extent of pollution damage and aid in developing strategies for reducing pollution. Decreasing deposition below the critical load is seen as means for preventing the risk of damage. However, even a decrease in the exceedance may infer that less damage will occur.

[4] UK Air Pollution Information System, www.apis.ac.uk.

2.3.6 **Table 3** presents the critical levels for the protection of vegetation for pollutants considered within this assessment.

Table 3: Critical Levels for the Protection of Vegetation		
Pollutant	**Concentration (µg/m³)**	**Averaging Period**
Oxides of Nitrogen (NO_x)	30	Annual mean
	75	24-hour mean

Air Quality Regulations

2.3.7 Many of the objectives within the Air Quality Strategy (AQS) have been made statutory in England through the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002, supporting the framework for Local Air Quality Management (LAQM).

2.3.8 These Regulations require that potential exceedances of the AQS objectives be assessed at locations situated outside buildings or other natural or man-made structures, whether above or below ground, where members of the public are regularly present.

2.3.9 The Air Quality Standards (Amendment) Regulations 2016 amended the Air Quality Standards Regulations 2010, transposing the European Union Ambient Air Quality Directive (2008/50/EC) into English law. This Directive establishes legally binding limit values for concentrations of major air pollutants impacting public health, including NO_2, PM_{10} and $PM_{2.5}$. The limit values for NO_2 and PM_{10} remain consistent with the relevant Air Quality Standards objectives, while the limit value for $PM_{2.5}$ is set as an annual mean concentration of 20 µg/m³.

Environment Act 1995

2.3.10 Under Part IV of the Environment Act 1995[5], local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the relevant Air Quality Regulations. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

[5] Environment Act 1995. London HMSO.

Clean Air Strategy (2019)

2.3.11 In 2019, the UK government released its Clean Air Strategy 2019[6], part of its 25 Year Environment Plan[7]. The Strategy sets out the comprehensive action that is considered to be required from across all parts of government and society.

2.3.12 The primary focus of air quality management has primarily related to NO_2, and its principal source in the UK, road traffic. The 2019 Strategy aims to broaden the focus to other areas, including actions on clean growth, and emissions from domestic wood burning stoves, industry and agriculture.

2.4 Planning Policy

2.4.1 A summary of the national and local planning policy relevant to the Proposed Development and air quality is provided overleaf.

National Planning Policy Framework (2026)

2.4.2 The Government's overall planning policies for England are described in the National Planning Policy Framework[8]. The core underpinning principle of the Framework is the presumption in favour of sustainable development, defined as:

> *"meeting the needs of the present without compromising the ability of future generations to meet their own needs".*

2.4.3 Paragraph 17 identifies three overarching and interdependent objectives for achieving sustainable development. The environmental objective, which is of relevance to air quality, is:

> *"to support efforts to mitigate and adapt to climate change, including moving to a low carbon economy; and to protect and enhance our natural, built and historic environment, including making effective use of land, improving biodiversity, using natural resources prudently, and minimising waste and pollution."*

2.4.4 Chapter 15 of the NPPF relates to promoting sustainable transport. **Policy TR3: Locating development in sustainable locations**, states that development proposals should reflect a number of principles, including that:

[6] Department for Environment, Food and Rural Affairs (2019) Clean Air Strategy 2019.
[7] Department for Environment Food and Rural Affairs (Defra) (2018) A Green Future: Our 25 Year Plan to Improve the Environment.
[8] Ministry of Housing, Communities & Local Government (2026) National Planning Policy Framework.

> *"The environmental impacts of traffic and transport infrastructure should be identified, assessed and taken into account – including taking opportunities to avoid or mitigate any adverse environmental effects, and to secure net environmental gains such as reductions in air pollution."*

2.4.5 Chapter 17 of the NPPF relates to pollution, public protection and security. **Policy P1: Planning for clean and safe places**, requires development plans to:

> *"support efforts to avoid and mitigate risks from natural and man-made hazards, minimise levels of pollution and create clean, liveable and safe places for people to live, work and visit".*

2.4.6 In particular, development plans should allocate land where, taking account of the potential for mitigation:

> *"occupiers and users will not be put at risk from, or be adversely affected by, unacceptable levels of pollution";* and

> *"development proposals will not cause unacceptable levels of pollution, either alone or in combination with other pollution sources, taking into account communities which may be particularly vulnerable to its effects, such as children and older people, as well as habitats and species which may be vulnerable to pollution".*

2.4.7 Policy P1 also requires development plans to:

> *"Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area (such as by identifying opportunities for strategic nature-based solutions)."*

2.4.8 **Policy P3: Living conditions and pollution**, provides the relevant national decision-making policy for individual development proposals. It states that:

> *"Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity."*

2.4.9 It further states that development proposals should:

> *"Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions;"*
>
> *"Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting);"* and
>
> *"Sustain and contribute to compliance with relevant limit values or national objectives and targets for air pollutants including $PM_{2.5}$. Development proposals should take account of Air Quality Management Areas and be consistent with the objectives of relevant Air Quality Action Plans, Clean Air Plans and Local Air Quality Strategies."*

2.4.10 Policy P3 also confirms that:

> *"In applying this policy, it should be assumed, unless there is clear evidence to the contrary, that separate regulatory regimes for the control of pollution will operate effectively, as set out in policy DM7."*

2.4.11 The AQA has been undertaken in accordance with the NPPF.

2.5 Local Planning Policy

Huntingdonshire Local Plan to 2036

2.5.1 The current adopted Development Plan is made up of the Huntingdonshire's Local Plan[9], neighbourhood plans, and the Cambridgeshire and Peterborough Minerals and Waste Plans. The Development Plan is supported by a series of other planning policy documents that add detail to the policies in development plan documents and provide guidance on particular topics.

[9] Huntingdonshire District Council (2019) Huntingdonshire's Local Plan to 2036 [Online] Available at https://www.huntingdonshire.gov.uk/media/3872/190516-final-adopted-local-plan-to-2036.pdf.

2.5.2 Huntingdonshire's Local Plan to 2036 sets out the Council's approach to securing sustainable development from 2011 to 2036 in order to meet identified needs.

2.5.3 An overview of this document identified the following policy of relevance to air quality and this report:

> ***"LP 36***
>
> ***Air Quality***
>
> *A proposal will need to be accompanied by an Air Quality Assessment where:*
>
> *a. it is for large scale major development, defined in the 'Glossary';*
>
> *b. it would potentially conflict with an Air Quality Action Plan;*
>
> *c. any part of the site is located within 50m of an Air Quality Management Area (AQMA) or a Clean Air Zone (CAZ);*
>
> *d. a significant proportion of the traffic generated would go through an AQMA or a CAZ; or*
>
> *e. any part of the site is located within 100m of a monitoring site where the annual mean level of nitrogen dioxide exceeds 35µg/m^3.*
>
> *An Air Quality Assessment should be proportionate to the nature and scale of the proposal and the level of concern about air quality, but should assess:*
>
> *f. the existing state of air quality surrounding the site;*
>
> *g. how the proposal could affect air quality during construction and operational phases;*
>
> *h. the extent to which people could be exposed to poor air quality; and*
>
> *i. how biodiversity could be affected by changes in air quality as a result of the proposal.*
>
> *A proposal will need to be accompanied by a low emissions strategy where the air quality assessment shows that the proposal would:*
>
> *j. have a significant adverse effect on air quality;*
>
> *k. have an adverse effect on the air quality factors that led to the affected AQMA being designated;*

l. cause a significant increase in the number of people that would be exposed to poor air quality; or

m. lead to a designated nature conservation site or protected species that is sensitive to poor air quality being adversely affected by changes in air quality.

The low emissions strategy will include measures that mitigate the impacts of the proposed development by contributing to the improvement of air quality and/ or the reduction of emissions relating to the designation of the affected AQMA/ CAZ, prioritising actions identified in relevant Air Quality Action Plans/ CAZ action plans or equivalent documents.

In other circumstances, where identified as necessary based on a transport assessment/ statement, measures to reduce air pollution arising from traffic and traffic congestion may also be required."

2.5.4 On 24 January 2023 HDC's Cabinet agreed to the preparation of a full update to the adopted Local Plan which will set out a plan for how the district will grow over future decades.

2.5.5 It is understood that the new Local Plan is intended to be submitted for examination by the end of December 2026.

Guidance

2.5.6 A summary of the publications referred to in undertaking this assessment is provided below.

Local Air Quality Management Review and Assessment Technical Guidance (2022)

2.5.7 The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their review and assessment work[10]. The guidance was updated in August 2022, following the enactment of measures in the Environment Act 2021 which aim to enhance the LAQM framework to enable greater localised action on air pollution. Referred to herein as LAQM.TG22, the updated guidance has been used where appropriate in the following assessment.

Land-Use Planning & Development Control: Planning for Air Quality (2017)

[10] Department for Environment, Food and Rural Affairs (Defra) (2021) Part IV The Environment Act 1995 as amended by the Environment Act 2021 Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG22.

2.5.8 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance[11] that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

Guidance on the Assessment of Dust from Demolition and Construction (2024)

2.5.9 This document[12], originally published by the IAQM in 2014, but updated in 2024, was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} and $PM_{2.5}$ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

[11] Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017) Land Use Planning & Development Control: Planning for Air Quality.
[12] Institute of Air Quality Management (Version 2.2 Updated January 2024) Guidance on the Assessment of Dust from Demolition and Construction.

3 BASELINE

3.1 Introduction

3.1.1 Existing air quality conditions in the vicinity of the Site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

3.2 Local Air Quality Management

3.2.1 As required by the Environment Act (1995), HDC undertake review and assessment of air quality within their area of jurisdiction. The main source of air pollution within the Borough, as with most local authorities across the UK, is from road traffic emissions. There are currently no AQMAs declared across HDC.

3.3 Air Quality Monitoring

3.3.1 Monitoring of pollutant concentrations is undertaken by HDC throughout their area of jurisdiction. According to the most recent ASR, HDC undertook non-automatic (passive) monitoring of NO_2 at 44 sites during 2025. The closest of these monitoring sites to the Site is approximately 320m to the south. Recent monitoring results from the monitors within 1km of the Site are presented in **Table 4** and shown on **Figure 1** Site Location and Context.

Table 4: Monitoring Results – NO_2

Monitoring Site	Site Type	Distance to Site (m)	Monitored NO_2 Concentration ($\mu g/m^3$)				
			2021	2022	2023	2024	2025
St Ives 5	RS	320	24.3	24.5	23.4	22.5	25.2
St Ives 3	RS	830	-	-	-	-	12.0
St Ives 1	UB	840	11.3	12.9	11.0	9.7	12.0

Results rounded to 1 d.p. **Bold** denotes an exceedance of the annual mean objective.
RS = roadside, UB = urban background.

3.3.2 As **Table 4** shows, there have been no monitored exceedances of the annual mean NO_2 objective at the three closest monitoring locations to the Site since 2021. These are however situated close to relevant receptors, with no monitors located within the Somersham Road Industrial Estate itself.

3.3.3 HDC undertake monitoring of PM_{10} and $PM_{2.5}$ at the one automatic monitor location within their jurisdiction, however this monitor is approximately 8km to the west of the Site close to Huntingdon town centre, and as such is not considered representative of conditions at the Site.

3.4 Background Pollutant Concentrations

3.4.1 Predictions of background pollutant concentrations on a 1 km-by-1 km basis have been produced by DEFRA for the entire of the UK to assist local authorities in their review and assessment of air quality. The proposed site is located in grid square 532500, 272500. Data for this location is summarised in **Table 5**. It should be noted that $PM_{2.5}$ background concentrations were not available at the time of assessment as the Defra background concentrations online database was temporarily offline to apply security updates. NO_2 and PM_{10} background concentrations had been downloaded previously by the Client and were provided.

Table 5: Predicted Background Pollutant Concentrations

Pollutant	Predicted Background Pollutant Concentration (µg/m³)
NO_2	7.34
PM_{10}	13.33

3.4.2 It should be noted that background concentrations of NO_2 and PM_{10} are predicted for 2026. These are the most recent predictions available from DEFRA and are therefore considered to provide a reasonable representation of background concentrations in the vicinity of the Site.

3.4.3 If required, when $PM_{2.5}$ background concentrations become available, these can be added to the relevant modelled outputs to fully assess impacts on $PM_{2.5}$.

3.5 Sensitive Receptors

3.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality. These were defined for human receptors in the following Sections.

Human Receptors

3.5.2 A desk-top study was undertaken in order to identify any sensitive human receptor locations in the vicinity of the site that required specific consideration during the assessment. These are summarised in **Table 6**. All human receptors have been modelled at 1.5m above ground level which is considered representative of normal breathing height.

Table 6: Sensitive Human Receptor Locations			
Receptor		NGR (m)	
		X	Y
ER1	Residential – Russet Close	531991.6	272288.2
ER2	Residential – Russet Close	531915.8	272308.6
ER3	Residential – Nursery Gardens	531833.0	272330.2
ER4	Residential – Nursery Gardens	531774.5	272361.7
ER5	Residential – Woodside Way	531742.4	272416.7
ER6	Residential – Dart Close	531738.2	272513.0
ER7	Residential – Dart Close	531759.2	272595.9
ER8	Residential – Dart Close	531771.8	272681.8
ER9	Residential – Dart Close	531784.5	272745.1
ER10	Residential – Derwent Close	531803.5	272853.7
ER11	Residential – Derwent Close	531818.0	272965.8
ER12	Residential – Chelmer Close	531836.3	273097.3
ER13	Residential – Hillside View	532331.6	273370.5
ER14	Residential – Giffords Farm	532711.3	272373.0
ER15	Residential – Giffords Farm	532750.3	272394.6

3.5.3 Reference should be made to **Figure 2** for a map of the sensitive human receptor locations.

Ecological Receptors

3.5.4 Atmospheric emissions from the facility also have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation of Habitats and Species Regulations (2010) and subsequent amendments require competent authorities to review applications and consents that have the potential to impact on ecological sites. A review of local designations indicated no nearby sensitive ecological receptors and this aspect has therefore been scoped out of this assessment.

4 METHODOLOGY

4.1 Introduction

4.1.1 Combustion emissions from the proposed biomass boiler have the potential to cause air quality impacts in the vicinity of the site. These have been quantified through dispersion modelling in accordance with the methodology outlined in the following Sections.

4.2 Dispersion Model

4.2.1 Dispersion modelling of emissions was undertaken using ADMS-6 (v6.0.2.0), which is developed by Cambridge Environmental Research Consultants (CERC) Ltd. ADMS-6 is a short-range dispersion modelling software package that simulates a wide range of buoyant and passive releases to atmosphere. It is a new generation model utilising boundary layer height and Monin-Obukhov length to describe the atmospheric boundary layer and a skewed Gaussian concentration distribution to calculate dispersion under convective conditions.

4.2.2 The model utilises hourly meteorological data to define conditions for plume rise, transport and diffusion. It estimates the concentration for each source and receptor combination for each hour of input meteorology and calculates user-selected long-term and short-term averages.

4.3 Modelling Scenarios

4.3.1 The scenarios considered in the modelling assessment for human receptors are summarised in **Table 7**.

Table 7: Assessment Scenarios

Parameter	Modelled As	
	Long Term	Short Term
NO_2	Annual mean	99.8th percentile (%ile) 1-hour mean
PM_{10}	Annual mean	90.4th %ile 24-hour mean
$PM_{2.5}$	Annual mean	-

4.3.2 Some short-term air quality criteria are framed in terms of the number of occasions in a calendar year on which the concentration should not be exceeded. As such, the %iles shown in **Table 7** were selected to represent the relationship between the permitted number of exceedances of short-period concentrations and the number of periods within a calendar year.

4.3.3 Predicted pollutant concentrations were summarised in the following formats:

- Process Contribution (PC) - Predicted pollutant concentration as a result of emissions from the proposed plant only; and,
- Predicted Environmental Concentration (PEC) - Total predicted pollutant concentration as a result of emissions from the proposed plant, as well as background levels.

4.3.4 Predicted ground level pollutant concentrations and deposition rates were compared with the relevant AQOs, EALs, critical levels and critical loads. These criteria are collectively referred to as Environmental Quality Standards (EQSs).

4.4 Assessment Area

4.4.1 The assessment area was defined based on the facility location, anticipated pollutant dispersion patterns and the positioning of sensitive receptors. Ambient concentrations were predicted over NGR: 531096, 271537 to 533096, 273537.

4.5 Process Conditions and Emissions

4.5.1 A summary of the inputs used in the assessment is provided in **Table 8**. This information was provided by the Applicant.

Table 8: Process Conditions

Parameter	Unit	Stack
Stack location	NGR (m)	532096, 272537
Stack height	m	11.30
Stack diameter	m	0.35
Exhaust gas temperature	°C	180
Exhaust gas volumetric flow rate	m^3/hr	1546.67
Exhaust gas volumetric flow rate[(a)]	Nm^3/hr	932.30
Exhaust gas efflux velocity	m/s	4.46

Note: (a) Dry, 0°C.

4.5.2 Reference should be made to **Figure 2** for a map of the emission point location.

4.6 Emissions

4.6.1 The anticipated pollutant concentrations in the exhaust gas streams were provided by the Client. These are shown in **Table 9**.

Table 9: Pollutant Emission Concentrations	
Pollutant	**Pollutant Emission Concentration (mg/m^3)**
NO_x	171.89
Particulate Matter (PM)	21.81

4.6.2 The pollutant mass emission rates for use in the assessment were derived from the concentrations shown in **Table 9** and the flow rates shown in **Table 8**. The results are summarised in **Table 10**. PM emission concentrations were provided and so to provide a conservative assessment, this emission rate was used for both PM_{10} and $PM_{2.5}$.

Table 10: Pollutant Mass Emission Rates	
Pollutant	**Pollutant Mass Emission Rate (g/s)**
NO_x	0.074
PM_{10}	0.009
$PM_{2.5}$	0.009

4.6.3 Emissions were modelled for 24 hours per day, 7 days a week, to represent the plant being used continuously, when required, as outlined by the Client. It is understood that the plant will not operate constantly, but when it is used it could be in use 24 hours a day, 7 days a week.

4.7 NO_x to NO_2 Conversion

4.7.1 Emissions of total NO_x from combustion processes are predominantly in the form of nitric oxide (NO). Excess oxygen in the combustion gases and further atmospheric reactions cause the oxidation of NO to NO_2. Comparisons of ambient NO and NO_2 concentrations in the vicinity of point sources in recent years has indicated that it is unlikely that more than 30% of the NO_x is present at ground level as NO_2.

4.7.2 Modelled NO_x concentrations have been converted to NO_2 concentrations using the screening approach set out in UK air quality guidance. For the long-term assessment, 70% of the modelled NO_x PC has been assumed to be NO_2, with the relevant background NO_2 concentration added to determine the PEC. For the short-term assessment, 35% of the modelled NO_x PC has been assumed to be NO_2, with twice the background NO_2 concentration added to determine the PEC. The resulting PECs have been compared against the relevant air quality objectives.

4.8 Building Effects

4.8.1 The dispersion of substances released from elevated sources can be influenced by the presence of buildings close to the emission points. Structures can interrupt the wind flows and cause significantly higher ground-level concentrations close to the source than would arise in the absence of the buildings.

4.8.2 Analysis of the site layout indicated that a number of structures should be included within the model in order to take account of effects on pollutant dispersion. Input geometries are shown in **Table 11**.

Table 11: Building Geometries

Building	NGR (m)		Height (m)	Length (m)	Width (m)	Angle (°)
	X	Y				
Plant Room	532095.9	272538.1	3.225	2.9	13.5	275.45
Print Hall	532123.4	272546.2	8.5	44.37	30.6	188.14
Warehouse	532058.8	272512.1	9.0	53.0	46.8	95.94
Factory	532112.9	272496.7	7.5	46	60	182.29

4.8.3 Reference should be made to **Figure 2** for a map of the building locations.

4.9 Meteorological Data

4.9.1 Meteorological data from the Site over the period 1st January 2021 to 31st December 2025 (inclusive) has been obtained from assimilation and short term forecast fields of the Numerical Weather Prediction (NWP) system known as the Global Forecast System (GFS) which is used to forecast meteorological data for specific locations.

4.9.2 All meteorological files used in the assessment were provided by AS Modelling & Data Ltd, which is an established distributor of data within the UK.

4.9.3 A windrose of the five years worth of wind data used in the model is shown in **Figure 3**.

4.10 Roughness Length

4.10.1 The roughness length (z_0) is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents and meteorological site, as meteorological data has been provided for the Site. This is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'parkland, open suburbia'.

4.11 Background Concentrations

4.11.1 Review of existing data in the vicinity of the site was undertaken in Section 3 in order to identify suitable background values for use in the assessment. Predicted background concentrations were utilised to represent existing concentrations in the vicinity of the site. A summary of the relevant values is provided in **Table 12**.

Table 12: Background Pollutant Concentrations – Sensitive Human Receptors

Receptor	Background NO_2 Pollutant Concentrations Used in Model ($\mu g/m^3$)	Background PM_{10} Pollutant Concentrations Used in Model ($\mu g/m^3$)	Source
ER1 – ER11	7.58	12.14	Client via DEFRA Mapping
ER12	6.35	11.99	Client via DEFRA mapping
ER13	6.18	13.20	Client via DEFRA mapping
ER14 – ER15	7.34	13.33	Client via DEFRA mapping

4.11.2 It is not possible to add short-term peak baseline and process concentrations. This is because the conditions which give rise to peak ground-level concentrations of substances emitted from an elevated source at a particular location and time are likely to be different to the conditions which give rise to peak concentrations due to emissions from other sources. This point is addressed in EA guidance 'Air emissions risk assessment for your environmental permit'[13], which advises that an estimate of the maximum combined pollutant concentration can be obtained by adding the maximum predicted short-term concentration due to emissions from the source to twice the annual mean baseline concentration. This approach was adopted throughout the assessment.

4.12 Assessment Criteria

4.12.1 The significance of predicted air quality impacts at sensitive human receptors was determined in accordance with the guidance provided within the Institute of Air Quality Management (IAQM) document 'Land-Use Planning & Development Control: Planning for Air Quality'[14]. Using this methodology impacts on annual mean concentrations are defined based on the interaction between the predicted pollutant concentration with the development in place (PEC) and the magnitude of change (PC), as outlined in **Table 13**.

[13] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.

[14] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

Table 13: Significance of Impact - Long Term Concentrations				
Concentration at Receptor in Assessment Year (PEC)	**Predicted Concentration Change as Proportion of Criteria (PC) (%)**			
	1	**2 - 5**	**6 - 10**	**> 10**
75% or less of EQS	Negligible	Negligible	Slight	Moderate
76 - 94% of EQS	Negligible	Slight	Moderate	Moderate
95 - 102% of EQS	Slight	Moderate	Moderate	Substantial
103 - 109% of EQS	Moderate	Moderate	Substantial	Substantial
110% or more of EQS	Moderate	Substantial	Substantial	Substantial

4.12.2 The matrix shown in **Table 13** is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

4.12.3 The significance of impacts on short-term pollutant concentrations at sensitive receptors was determined in accordance with the criteria outlined in the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality', as summarised in **Table 14**.

Table 14: Significance of Impact - Short Term Concentrations	
Predicted Concentration Change as Proportion of Criteria (PC) (%)	**Significance of Impact**
Less than 10	Negligible
11 – 20	Slight
21 – 50	Moderate
Greater than 51	Substantial

4.12.4 Following the prediction of impacts at discrete receptor locations, the IAQM provides guidance on determining the overall air quality impact significance of the operation of a development and states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

4.13 Modelling Uncertainty

4.13.1 Uncertainty in dispersion modelling predictions can be associated with a variety of factors, including:

- Model uncertainty - due to model limitations;
- Data uncertainty - due to errors in input data, including emission estimates, operational procedures, land use characteristics and meteorology; and,
- Variability - randomness of measurements used.

4.13.2 Potential uncertainties in the model results were minimised as far as practicable and worst-case inputs used in order to provide a robust assessment. This included the following:

- Choice of model - ADMS-6 is a commonly used atmospheric dispersion model and results have been verified through a number of studies to ensure predictions are as accurate as possible;
- Meteorological data - Modelling was undertaken using five annual meteorological data sets predicted for the Site specifically. The analysis was based on the worst-case year for each averaging period to ensure maximum concentrations were considered;
- Plant operating conditions - Operational parameters were provided by the Client. As such, these are considered to be representative of normal operating conditions;
- Emission rates - Emission rates were derived from the specification for the proposed plant. Emissions were assumed to be constant throughout the modelling period, which does not allow for plant shutdown or periods of reduced work load. This is likely to overestimate actual emissions and therefore result in a robust assessment;
- Background concentrations - Background pollutant levels were obtained from the DEFRA mapping study, APIS and national monitoring networks. These are considered representative of baseline air quality conditions at sensitive locations within the vicinity of the site;
- Receptor locations - A Cartesian Grid was included in the model in order to provide suitable data for contour plotting. Receptor points were also included at sensitive locations to provide additional consideration of these areas; and,
- Variability - All model inputs were as accurate as possible and worst-case conditions were considered as necessary in order to ensure a robust assessment of potential pollutant concentrations.

4.13.3 Results were considered in the context of the relevant EQSs and assessment significance criteria. It is considered that the use of the stated measures to reduce uncertainty and the use of worst-case assumptions when necessary has resulted in model accuracy of an acceptable level.

5 RESULTS

5.1 Introduction

5.1.1 Dispersion modelling was undertaken using the inputs described in Section 4. The results are outlined in the following Section.

5.2 Maximum Pollutant Concentrations

5.2.1 The maximum predicted pollutant concentrations at any point within the modelling extents for any meteorological data set are summarised in **Table 15**.

Table 15: Maximum Predicted Mean Pollutant Concentrations

Pollutant	Averaging Period	EQS (µg/m^3)	PEC (µg/m^3)	PEC Proportion of EQS (%)
NO_2	Annual	40	7.78	19.5
	99.8th %ile 1-hour mean	200	17.1	8.6
PM_{10}	Annual	40	13.3	33.4
	90.4th %ile 24-hour mean	50	26.7	53.4
$PM_{2.5}$	Annual	20		

5.2.2 As shown in **Table 15**, there were no predicted exceedances of any EQS at any location for any pollutant or averaging period of interest.

5.3 Human Receptors

5.3.1 Predicted concentrations of each pollutant at the sensitive human receptor locations identified in **Table 6** are summarised in the following Sections.

Nitrogen Dioxide

5.3.2 Predicted annual mean NO_2 PECs at the sensitive receptor locations, inclusive of background levels, are summarised in **Table 16**.

Table 16: Predicted Annual Mean NO_2 Concentrations (µg/m^3)

Receptor		2021	2022	2023	2024	2025
ER1	Residential – Russet Close	7.78	7.72	7.74	7.71	7.77

Table 16: Predicted Annual Mean NO_2 Concentrations (µg/m^3)						
Receptor		**2021**	**2022**	**2023**	**2024**	**2025**
ER2	Residential – Russet Close	7.74	7.71	7.73	7.68	7.74
ER3	Residential – Nursery Gardens	7.69	7.68	7.68	7.65	7.69
ER4	Residential – Nursery Gardens	7.67	7.66	7.65	7.64	7.66
ER5	Residential – Woodside Way	7.66	7.64	7.64	7.63	7.65
ER6	Residential – Dart Close	7.64	7.64	7.64	7.64	7.65
ER7	Residential – Dart Close	7.63	7.63	7.64	7.65	7.65
ER8	Residential – Dart Close	7.63	7.64	7.63	7.65	7.65
ER9	Residential – Dart Close	7.63	7.65	7.63	7.64	7.65
ER10	Residential – Derwent Close	7.62	7.64	7.63	7.64	7.64
ER11	Residential – Derwent Close	7.62	7.63	7.62	7.62	7.62
ER12	Residential – Chelmer Close	6.38	6.39	6.38	6.38	6.38
ER13	Residential – Hillside View	6.21	6.21	6.21	6.21	6.21
ER14	Residential – Giffords Farm	7.39	7.39	7.39	7.39	7.38
ER15	Residential – Giffords Farm	7.39	7.39	7.39	7.39	7.38

5.3.3 As indicated in **Table 16**, annual mean NO_2 PECs were below the EQS of 40µg/m^3 at all sensitive receptor locations for all meteorological data sets.

5.3.4 The significance of predicted impacts on annual mean NO_2 concentrations at the receptor locations are summarised in **Table 17**. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 17: Predicted Impacts on Annual Mean NO_2 Concentrations				
Receptor		**Predicted Concentration (PEC)**	**Predicted Conc. Change as Proportion of EQS (PC) (%)**	**Impact Significance**
ER1	Residential – Russet Close	Below 75% of EQS	<1	Negligible

Table 17: Predicted Impacts on Annual Mean NO_2 Concentrations				
Receptor		**Predicted Concentration (PEC)**	**Predicted Conc. Change as Proportion of EQS (PC) (%)**	**Impact Significance**
ER2	Residential – Russet Close	Below 75% of EQS	<1	Negligible
ER3	Residential – Nursery Gardens	Below 75% of EQS	<1	Negligible
ER4	Residential – Nursery Gardens	Below 75% of EQS	<1	Negligible
ER5	Residential – Woodside Way	Below 75% of EQS	<1	Negligible
ER6	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER7	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER8	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER9	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER10	Residential – Derwent Close	Below 75% of EQS	<1	Negligible
ER11	Residential – Derwent Close	Below 75% of EQS	<1	Negligible
ER12	Residential – Chelmer Close	Below 75% of EQS	<1	Negligible
ER13	Residential – Hillside View	Below 75% of EQS	<1	Negligible
ER14	Residential – Giffords Farm	Below 75% of EQS	<1	Negligible
ER15	Residential – Giffords Farm	Below 75% of EQS	<1	Negligible

5.3.5 As shown in **Table 17**, impacts on annual mean NO_2 concentrations as a result of the operation of the plant were predicted to be **negligible** at all receptors.

5.3.6 The IAQM guidance states that states that only if the impact is greater than **slight**, the effect is considered **significant**. As such, overall impacts on annual mean NO_2 concentrations are considered to be **not significant**, in accordance with the stated guidance.

5.3.7 Predicted 99.8th %ile 1-hour mean NO_2 PECs at the sensitive receptor locations, inclusive of background levels, are summarised in **Table 18**.

Table 18: Predicted 99.8th %ile 1-hour Mean NO_2 Concentrations (µg/m^3)

Receptor		2021	2022	2023	2024	2025
ER1	Residential – Russet Close	16.85	16.83	16.80	16.74	17.09
ER2	Residential – Russet Close	16.81	16.76	16.88	16.62	16.91
ER3	Residential – Nursery Gardens	16.65	16.46	16.74	16.46	16.65
ER4	Residential – Nursery Gardens	16.67	16.43	16.64	16.41	16.49
ER5	Residential – Woodside Way	16.57	16.36	16.34	16.20	16.38
ER6	Residential – Dart Close	16.39	16.29	16.25	16.52	16.38
ER7	Residential – Dart Close	16.33	16.36	16.19	16.56	16.26
ER8	Residential – Dart Close	16.46	16.29	16.18	16.44	16.29
ER9	Residential – Dart Close	16.43	16.65	16.16	16.44	16.56
ER10	Residential – Derwent Close	16.14	16.41	16.23	16.30	16.23
ER11	Residential – Derwent Close	15.99	16.40	16.13	15.99	15.85
ER12	Residential – Chelmer Close	13.32	13.45	13.59	13.27	13.29
ER13	Residential – Hillside View	12.79	12.78	12.90	12.88	12.71
ER14	Residential – Giffords Farm	15.39	15.39	15.31	15.33	15.24
ER15	Residential – Giffords Farm	15.37	15.36	15.31	15.35	15.24

5.3.8 As indicated in **Table 18**, 1-hour mean NO_2 PECs were below the EQS of 200µg/m^3 at all sensitive receptor locations for all meteorological data sets.

5.3.9 The significance of predicted impacts on 1-hour mean NO_2 concentrations at the receptor locations are summarised in **Table 19**. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 19: Predicted Impacts on 1-hour Mean NO_2 Concentrations			
Receptor		**Predicted Concentration Change as Proportion of the EQS (PC) (%)**	**Impact Significance**
ER1	Residential – Russet Close	<10	Negligible
ER2	Residential – Russet Close	<10	Negligible
ER3	Residential – Nursery Gardens	<10	Negligible
ER4	Residential – Nursery Gardens	<10	Negligible
ER5	Residential – Woodside Way	<10	Negligible
ER6	Residential – Dart Close	<10	Negligible
ER7	Residential – Dart Close	<10	Negligible
ER8	Residential – Dart Close	<10	Negligible
ER9	Residential – Dart Close	<10	Negligible
ER10	Residential – Derwent Close	<10	Negligible
ER11	Residential – Derwent Close	<10	Negligible
ER12	Residential – Chelmer Close	<10	Negligible
ER13	Residential – Hillside View	<10	Negligible
ER14	Residential – Giffords Farm	<10	Negligible
ER15	Residential – Giffords Farm	<10	Negligible

5.3.10 As indicated in **Table 19**, impacts on 1-hour mean NO_2 concentrations as a result of the operation of the plant were predicted to be **negligible** at all receptors. As such, overall impacts on 1-hour mean NO_2 concentrations are considered to be **not significant**, in accordance with the stated guidance.

Particulate Matter

5.3.11 Predicted annual mean PM_{10} PECs at the sensitive receptor locations, inclusive of background levels, are summarised in **Table 20**.

Table 20: Predicted Annual Mean PM_{10} Concentrations (µg/m^3)						
Receptor		**2021**	**2022**	**2023**	**2024**	**2025**
ER1	Residential – Russet Close	12.18	12.17	12.17	12.17	12.18

Table 20: Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)						
Receptor		**2021**	**2022**	**2023**	**2024**	**2025**
ER2	Residential – Russet Close	12.17	12.17	12.17	12.16	12.17
ER3	Residential – Nursery Gardens	12.16	12.16	12.16	12.16	12.16
ER4	Residential – Nursery Gardens	12.16	12.16	12.16	12.15	12.16
ER5	Residential – Woodside Way	12.16	12.15	12.15	12.15	12.16
ER6	Residential – Dart Close	12.15	12.15	12.15	12.15	12.16
ER7	Residential – Dart Close	12.15	12.15	12.15	12.16	12.16
ER8	Residential – Dart Close	12.15	12.15	12.15	12.16	12.16
ER9	Residential – Dart Close	12.15	12.16	12.15	12.15	12.16
ER10	Residential – Derwent Close	12.15	12.16	12.15	12.15	12.15
ER11	Residential – Derwent Close	12.15	12.15	12.15	12.15	12.15
ER12	Residential – Chelmer Close	11.99	12.00	12.00	12.00	12.00
ER13	Residential – Hillside View	13.20	13.20	13.20	13.20	13.20
ER14	Residential – Giffords Farm	13.34	13.34	13.34	13.34	13.34
ER15	Residential – Giffords Farm	13.34	13.34	13.34	13.34	13.34

5.3.12 As indicated in **Table 20**, annual mean PM_{10} PECs were below the EQS of $40\mu g/m^3$ at all sensitive receptor locations for all meteorological data sets.

5.3.13 The significance of predicted impacts on annual mean PM_{10} concentrations at the receptor locations are summarised in **Table 21**. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 21: Predicted Impacts on Annual Mean PM_{10} Concentrations				
Receptor		**Predicted Concentration (PEC)**	**Predicted Conc. Change as Proportion of EQS (PC) (%)**	**Impact Significance**
ER1	Residential – Russet Close	Below 75% of EQS	<1	Negligible

Table 21: Predicted Impacts on Annual Mean PM_{10} Concentrations

Receptor		Predicted Concentration (PEC)	Predicted Conc. Change as Proportion of EQS (PC) (%)	Impact Significance
ER2	Residential – Russet Close	Below 75% of EQS	<1	Negligible
ER3	Residential – Nursery Gardens	Below 75% of EQS	<1	Negligible
ER4	Residential – Nursery Gardens	Below 75% of EQS	<1	Negligible
ER5	Residential – Woodside Way	Below 75% of EQS	<1	Negligible
ER6	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER7	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER8	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER9	Residential – Dart Close	Below 75% of EQS	<1	Negligible
ER10	Residential – Derwent Close	Below 75% of EQS	<1	Negligible
ER11	Residential – Derwent Close	Below 75% of EQS	<1	Negligible
ER12	Residential – Chelmer Close	Below 75% of EQS	<1	Negligible
ER13	Residential – Hillside View	Below 75% of EQS	<1	Negligible
ER14	Residential – Giffords Farm	Below 75% of EQS	<1	Negligible
ER15	Residential – Giffords Farm	Below 75% of EQS	<1	Negligible

5.3.14 As shown in **Table 21**, impacts on annual mean PM_{10} concentrations as a result of the operation of the plant were predicted to be **negligible** at all receptors. As such, overall impacts on annual mean PM_{10} concentrations are considered to be **not significant**, in accordance with the stated guidance.

5.3.15 Predicted 90.4th %ile 24-hour mean PM_{10} PECs at the sensitive receptor locations, inclusive of background levels, are summarised in **Table 22**.

Table 22: Predicted 90.4th %ile 24-hour Mean PM_{10} Concentrations (µg/m³)

Receptor		2021	2022	2023	2024	2025
ER1	Residential – Russet Close	24.53	24.51	24.53	24.49	24.56
ER2	Residential – Russet Close	24.50	24.49	24.51	24.45	24.52
ER3	Residential – Nursery Gardens	24.45	24.45	24.43	24.41	24.48
ER4	Residential – Nursery Gardens	24.44	24.42	24.40	24.40	24.42
ER5	Residential – Woodside Way	24.45	24.41	24.40	24.38	24.40
ER6	Residential – Dart Close	24.41	24.40	24.39	24.42	24.45
ER7	Residential – Dart Close	24.40	24.39	24.39	24.42	24.44
ER8	Residential – Dart Close	24.39	24.40	24.38	24.42	24.40
ER9	Residential – Dart Close	24.38	24.42	24.36	24.39	24.41
ER10	Residential – Derwent Close	24.38	24.41	24.37	24.39	24.39
ER11	Residential – Derwent Close	24.36	24.37	24.35	24.36	24.36
ER12	Residential – Chelmer Close	24.03	24.03	24.04	24.03	24.03
ER13	Residential – Hillside View	26.43	26.43	26.44	26.42	26.43
ER14	Residential – Giffords Farm	26.72	26.72	26.72	26.71	26.71
ER15	Residential – Giffords Farm	26.71	26.72	26.72	26.71	26.71

5.3.16 As indicated in **Table 22**, 24-hour mean PM_{10} PECs were below the EQS of 50µg/m³ at all sensitive receptor locations for all meteorological data sets.

5.3.17 The significance of predicted impacts on 24-hour mean PM_{10} concentrations at the receptor locations are summarised in **Table 23**. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 23: Predicted Impacts on 24-hour Mean PM_{10} Concentrations			
Receptor		Predicted Concentration Change as Proportion of the EQS (PC) (%)	Impact Significance
ER1	Residential – Russet Close	<10	Negligible
ER2	Residential – Russet Close	<10	Negligible
ER3	Residential – Nursery Gardens	<10	Negligible
ER4	Residential – Nursery Gardens	<10	Negligible
ER5	Residential – Woodside Way	<10	Negligible
ER6	Residential – Dart Close	<10	Negligible
ER7	Residential – Dart Close	<10	Negligible
ER8	Residential – Dart Close	<10	Negligible
ER9	Residential – Dart Close	<10	Negligible
ER10	Residential – Derwent Close	<10	Negligible
ER11	Residential – Derwent Close	<10	Negligible
ER12	Residential – Chelmer Close	<10	Negligible
ER13	Residential – Hillside View	<10	Negligible
ER14	Residential – Giffords Farm	<10	Negligible
ER15	Residential – Giffords Farm	<10	Negligible

5.3.18 As indicated in **Table 23**, impacts on 24-hour mean PM_{10} concentrations as a result of the operation of the plant were predicted to be **negligible** at all receptors. As such, overall impacts on 24-hour mean PM_{10} concentrations are considered to be **not significant**, in accordance with the stated guidance.

5.3.19 Predicted annual mean $PM_{2.5}$ PCs at the sensitive receptor locations, not inclusive of background levels due to them not being available at the time of writing, are summarised in **Table 24**. It should be noted that in accordance with the stated guidance, PECs do not need to be calculated if PCs are below 1% of the relevant long term EAL.

Table 24: Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)						
Receptor		2021	2022	2023	2024	2025
ER1	Residential – Russet Close	0.04	0.02	0.03	0.02	0.03
ER2	Residential – Russet Close	0.03	0.02	0.03	0.02	0.03
ER3	Residential – Nursery Gardens	0.02	0.02	0.02	0.01	0.02
ER4	Residential – Nursery Gardens	0.02	0.01	0.01	0.01	0.01
ER5	Residential – Woodside Way	0.01	0.01	0.01	0.01	0.01
ER6	Residential – Dart Close	0.01	0.01	0.01	0.01	0.01
ER7	Residential – Dart Close	0.01	0.01	0.01	0.01	0.01
ER8	Residential – Dart Close	0.01	0.01	0.01	0.01	0.01
ER9	Residential – Dart Close	0.01	0.01	0.01	0.01	0.01
ER10	Residential – Derwent Close	0.01	0.01	0.01	0.01	0.01
ER11	Residential – Derwent Close	0.01	0.01	0.01	0.01	0.01
ER12	Residential – Chelmer Close	0.01	0.01	0.01	0.01	0.01
ER13	Residential – Hillside View	0.01	0.01	0.01	0.01	0.01
ER14	Residential – Giffords Farm	0.01	0.01	0.01	0.01	0.01
ER15	Residential – Giffords Farm	0.01	0.01	0.01	0.01	0.01

5.3.20 As indicated in **Table 24**, $PM_{2.5}$ PCs were very low at all sensitive receptor locations for all meteorological data sets.

5.3.21 The significance of predicted impacts on $PM_{2.5}$ concentrations at the receptor locations are summarised in **Table 25**. These consider the maximum predicted change in concentration from the five meteorological datasets as a worst-case.

Table 25: Predicted Impacts on Annual Mean $PM_{2.5}$ Concentrations			
Receptor		Predicted Conc. Change as Proportion of EQS (PC) (%)	Impact Significance
ER1	Residential – Russet Close	<1	Negligible

Table 25: Predicted Impacts on Annual Mean $PM_{2.5}$ Concentrations			
Receptor		**Predicted Conc. Change as Proportion of EQS (PC) (%)**	**Impact Significance**
ER2	Residential – Russet Close	<1	Negligible
ER3	Residential – Nursery Gardens	<1	Negligible
ER4	Residential – Nursery Gardens	<1	Negligible
ER5	Residential – Woodside Way	<1	Negligible
ER6	Residential – Dart Close	<1	Negligible
ER7	Residential – Dart Close	<1	Negligible
ER8	Residential – Dart Close	<1	Negligible
ER9	Residential – Dart Close	<1	Negligible
ER10	Residential – Derwent Close	<1	Negligible
ER11	Residential – Derwent Close	<1	Negligible
ER12	Residential – Chelmer Close	<1	Negligible
ER13	Residential – Hillside View	<1	Negligible
ER14	Residential – Giffords Farm	<1	Negligible
ER15	Residential – Giffords Farm	<1	Negligible

5.3.22 As shown in **Table 25**, impacts on $PM_{2.5}$ concentrations as a result of the operation of the plant were predicted to be **negligible** at all receptors. As such, overall impacts on annual mean $PM_{2.5}$ concentrations are considered to be **not significant**, in accordance with the stated guidance.

Impacts of the Site Generated Traffic on the Local Area

5.3.23 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks.

5.3.24 A screening assessment has been conducted based on Stage 1 of the EPUK & IAQM criteria. The installation does not propose any new parking spaces additional to the already existing at the Site, and therefore the proposals do not meet the Stage 1 criteria.

5.3.25 It is understood that the installation of the proposed biomass boiler is to dispose of waste wood and this will not result in any additional trips being generated on the local road network.

5.3.26 Based on the above information, it is considered that the impact of Site generated vehicular trips on the surrounding roads is considered to be not significant, in accordance with the EPUK & IAQM screening criteria.

6 SUMMARY AND CONCLUSIONS

6.1.1 NoiseAir Limited was commissioned to undertake this AQA in support of a proposed installation of a biomass boiler to process wastewood at Beamglow, Somersham Road, St Ives PE27 3LP.

6.1.2 Atmospheric emissions from the plant at the site have the potential to cause air quality impacts at sensitive locations during normal operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and consider potential effects.

6.1.3 Dispersion modelling was undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the plant. Impacts were quantified and the results compared with the relevant EQSs, Interim Target and significance criteria.

6.1.4 Predicted concentrations of all pollutants were below the relevant EQSs at all receptor locations for all meteorological data sets modelled. Review of the dispersion modelling results indicated that impacts on pollutant concentrations were predicted to be **negligible** at all receptors. As such, overall impacts are considered to be **not significant** in accordance with the IAQM guidance.

6.1.5 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the proposals.

FIGURES

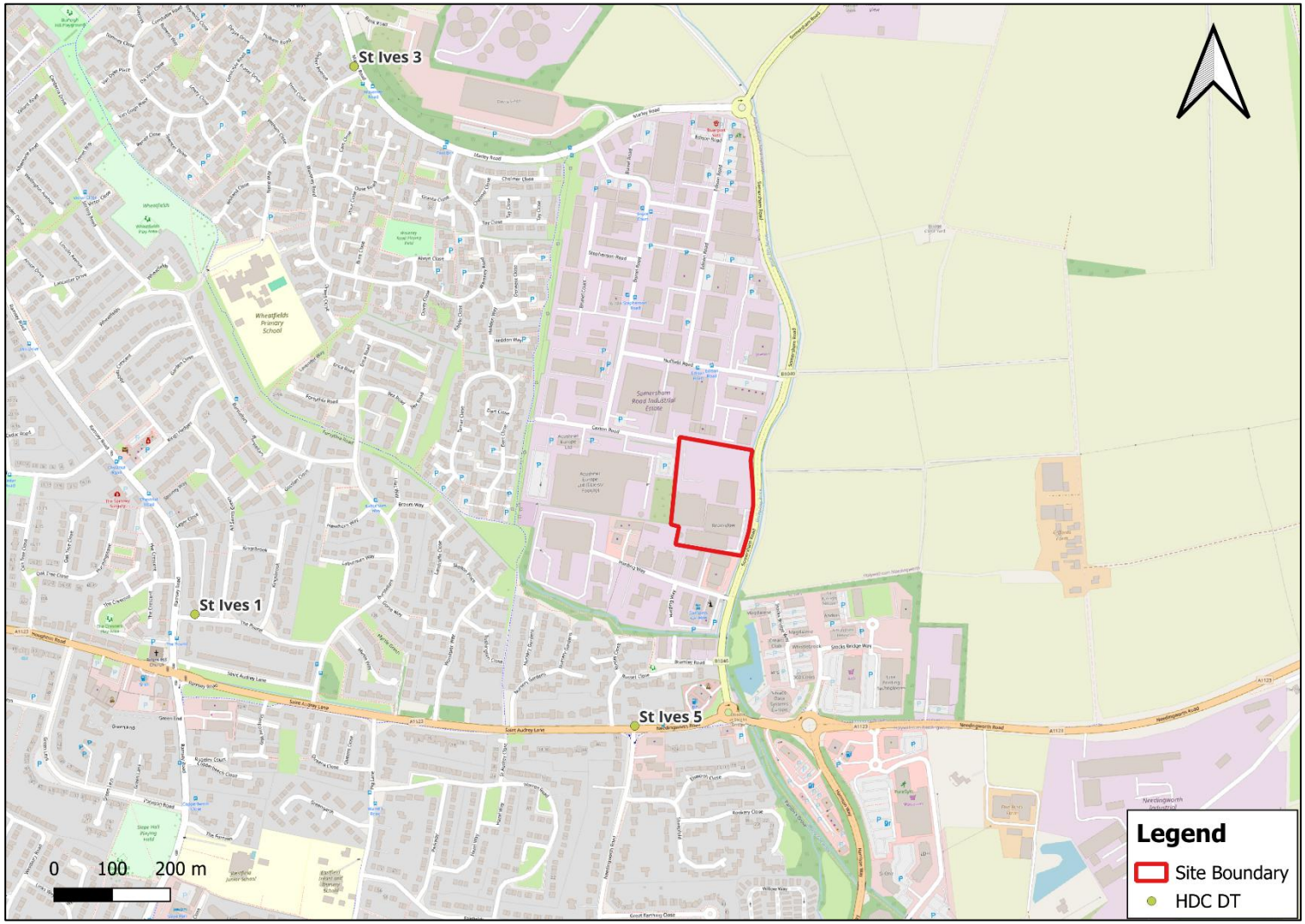


Figure 1 Site Location and Context

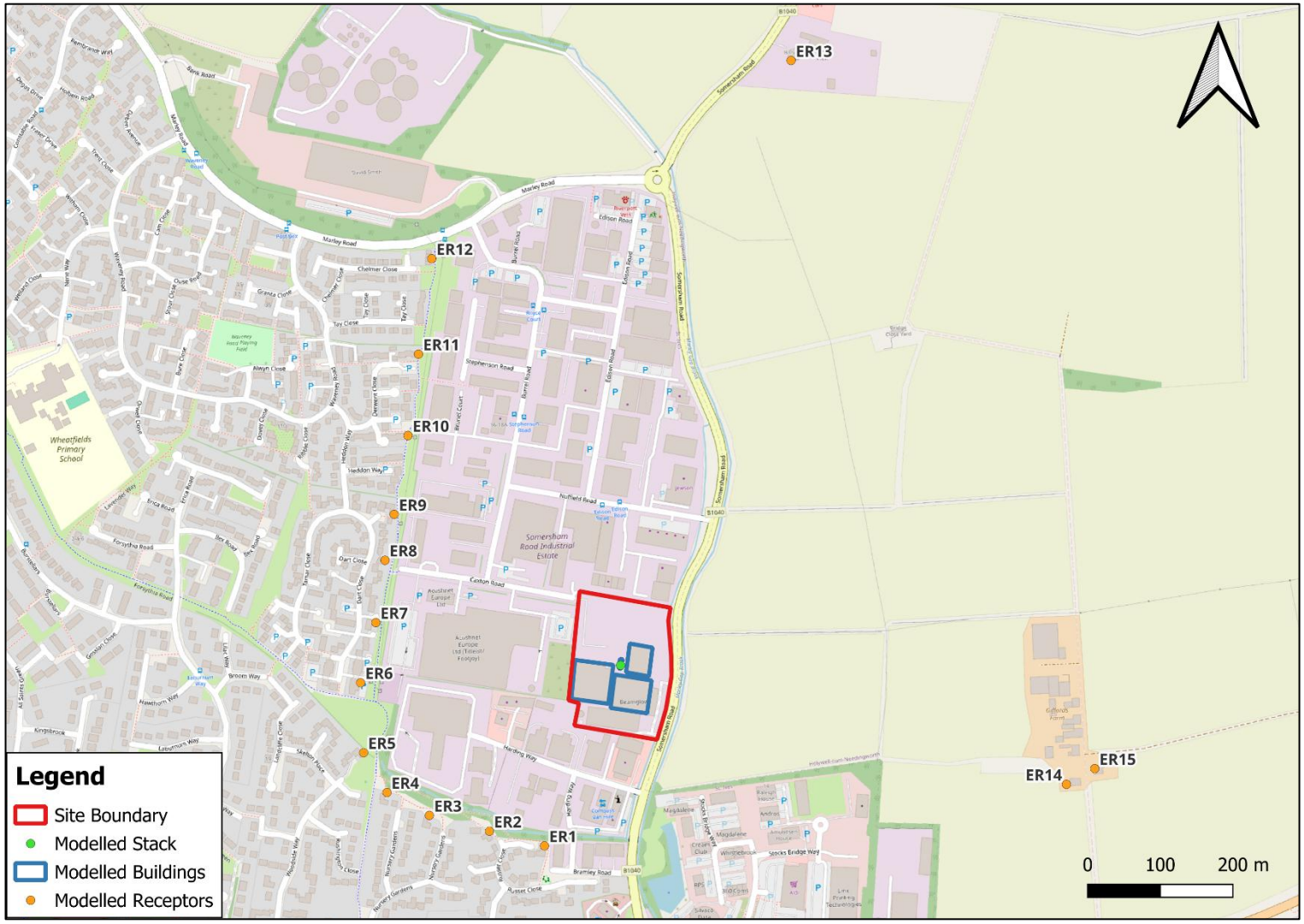


Figure 2 Site Location and Model Inputs

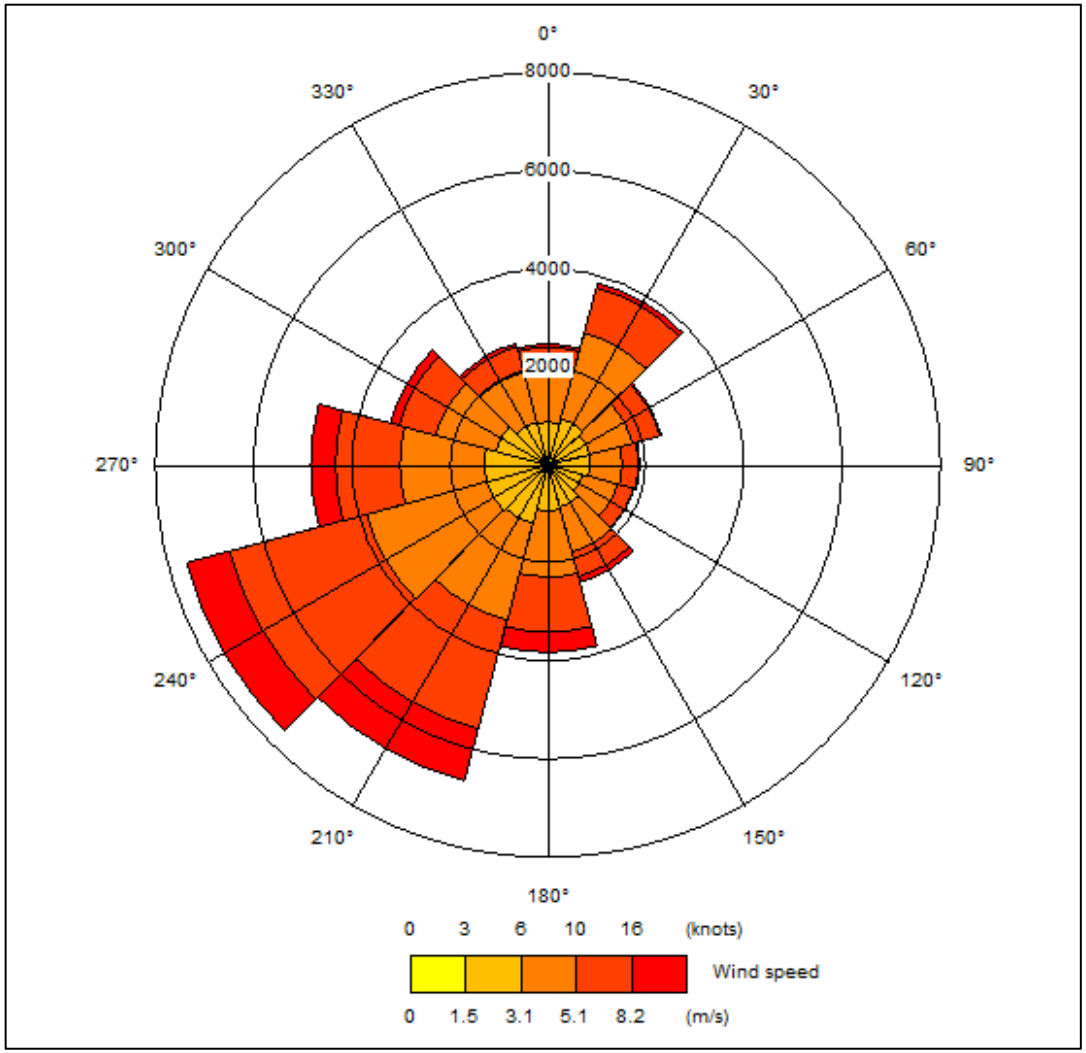


Figure 3 Wind Rose of 2021 – 2025 Meteorological Data for NGR: 532098, 272553

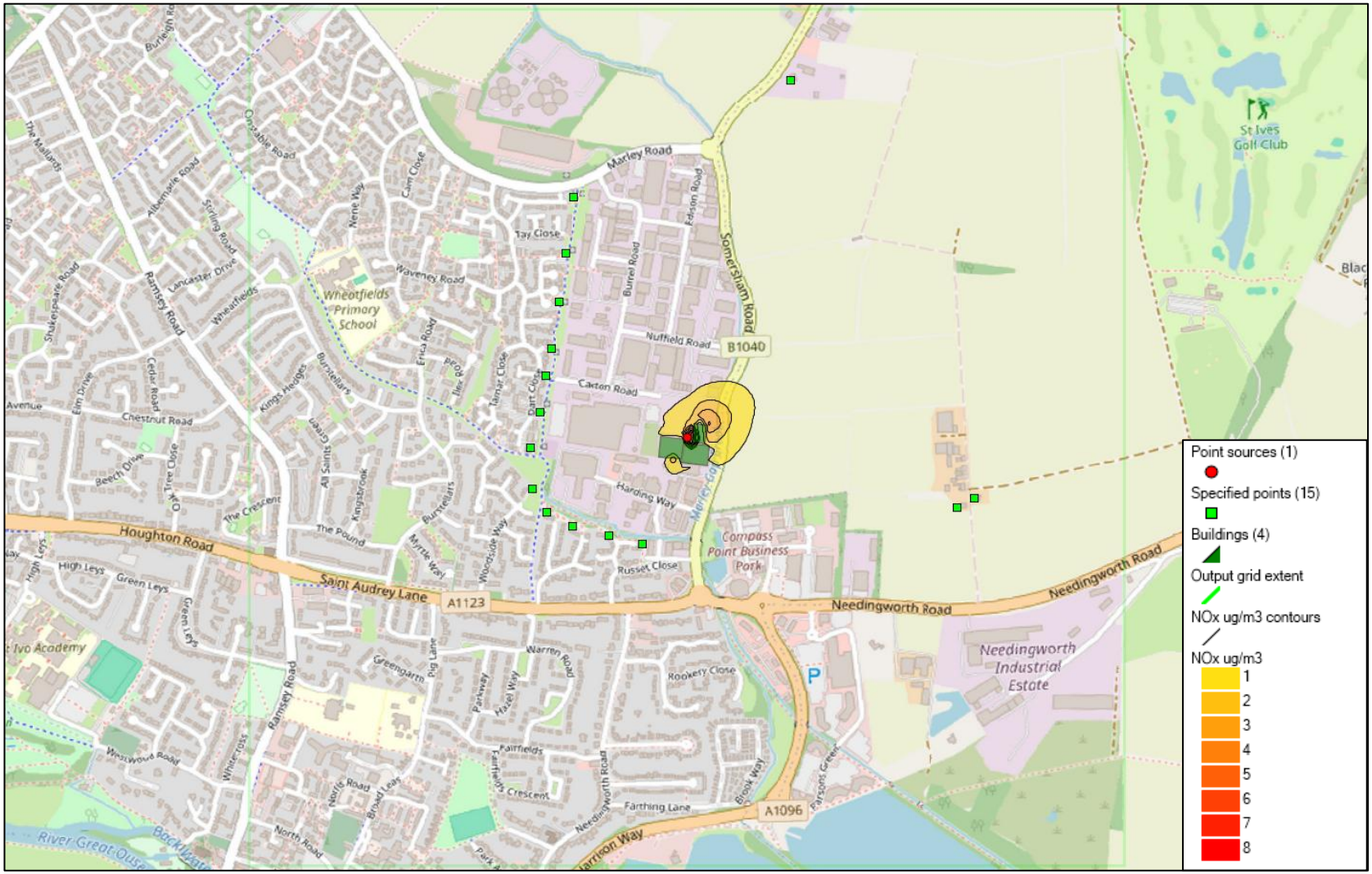


Figure 4 Predicted Annual Mean NOx Process Contribution (2025 Meteorological Data)

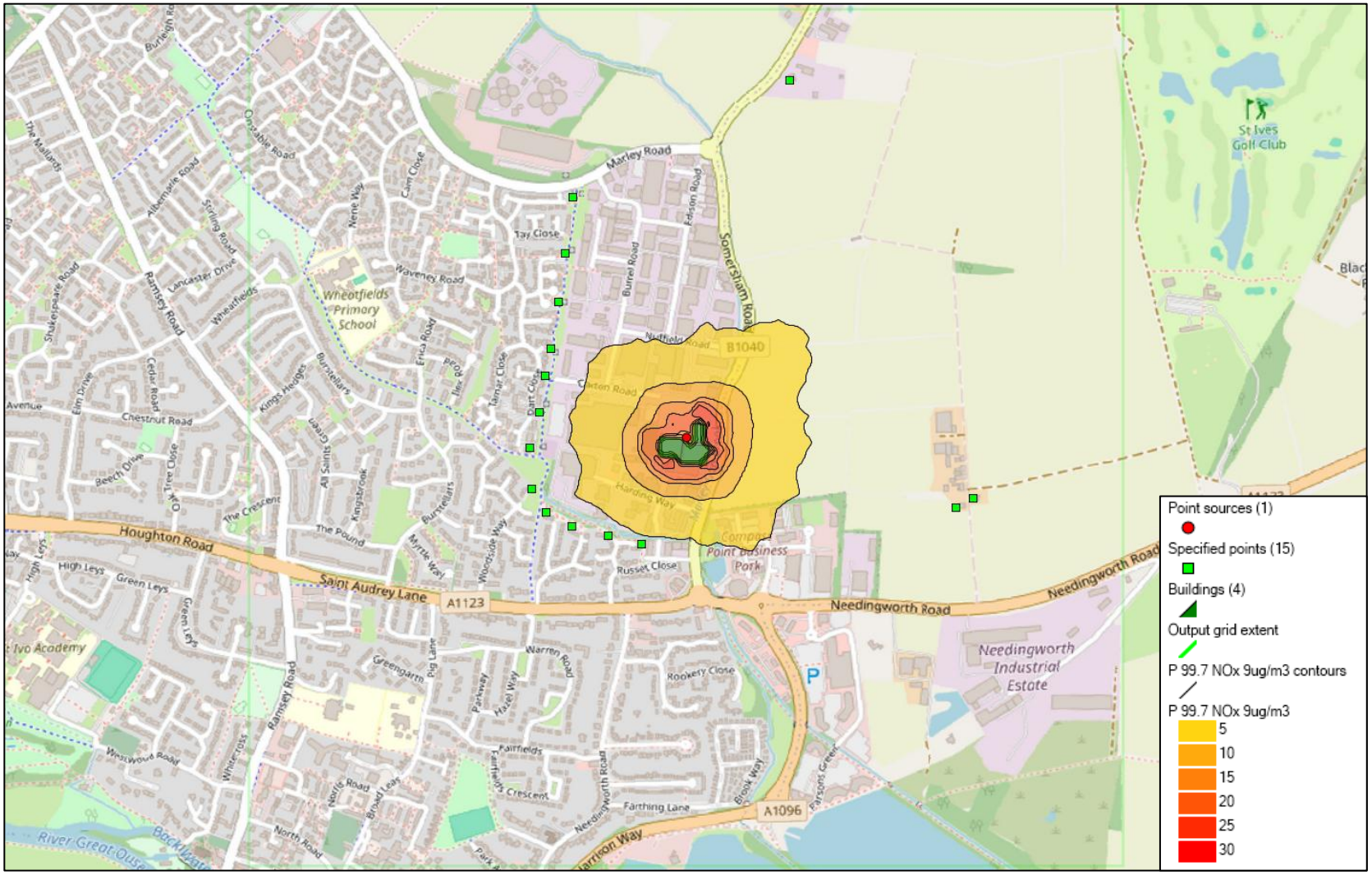


Figure 5 Predicted 1-hour Mean NO_x Process Contribution (2025 Meteorological Data)

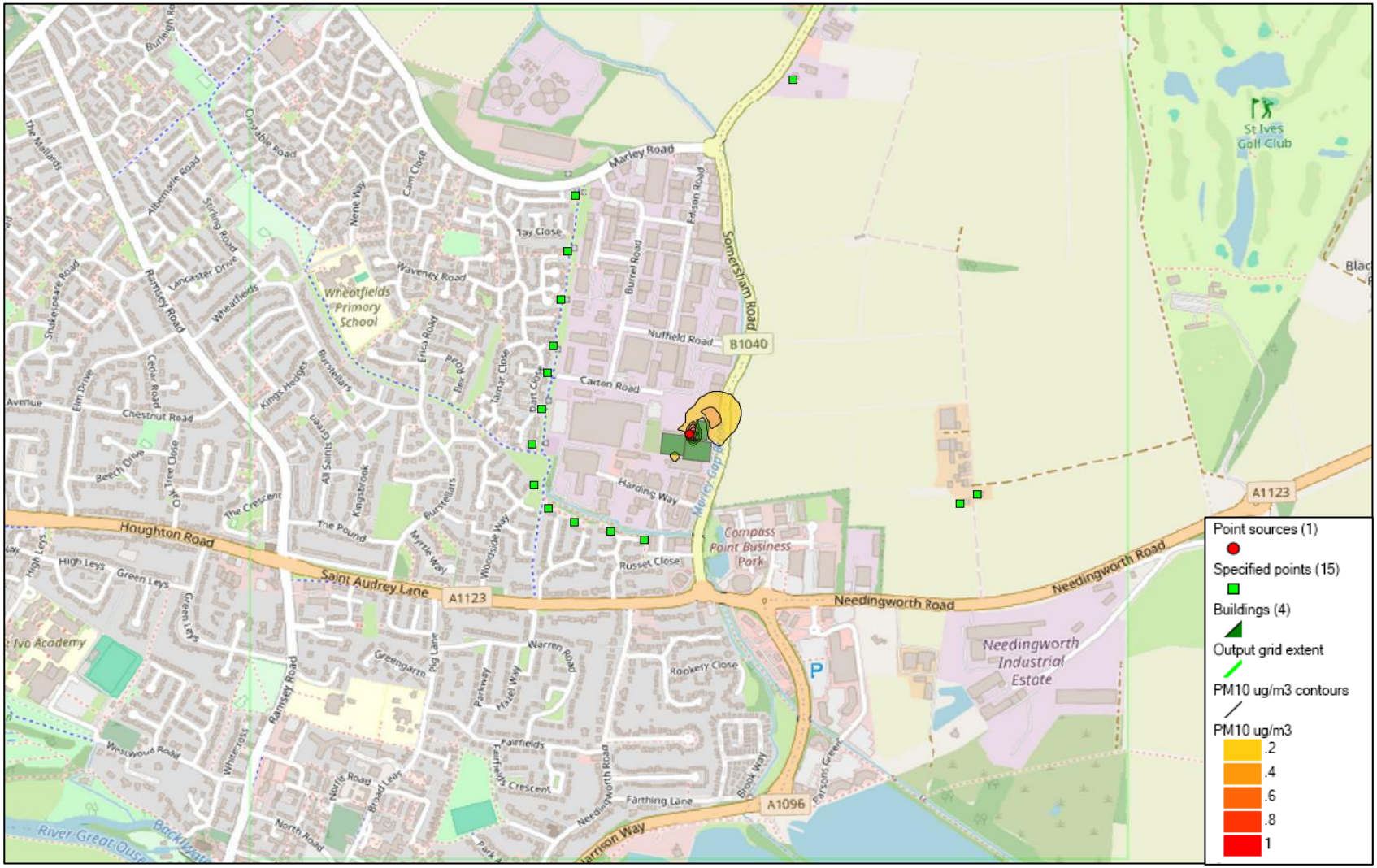


Figure 6 Predicted Annual Mean PM_{10} Process Contribution (2025 Meteorological Data)

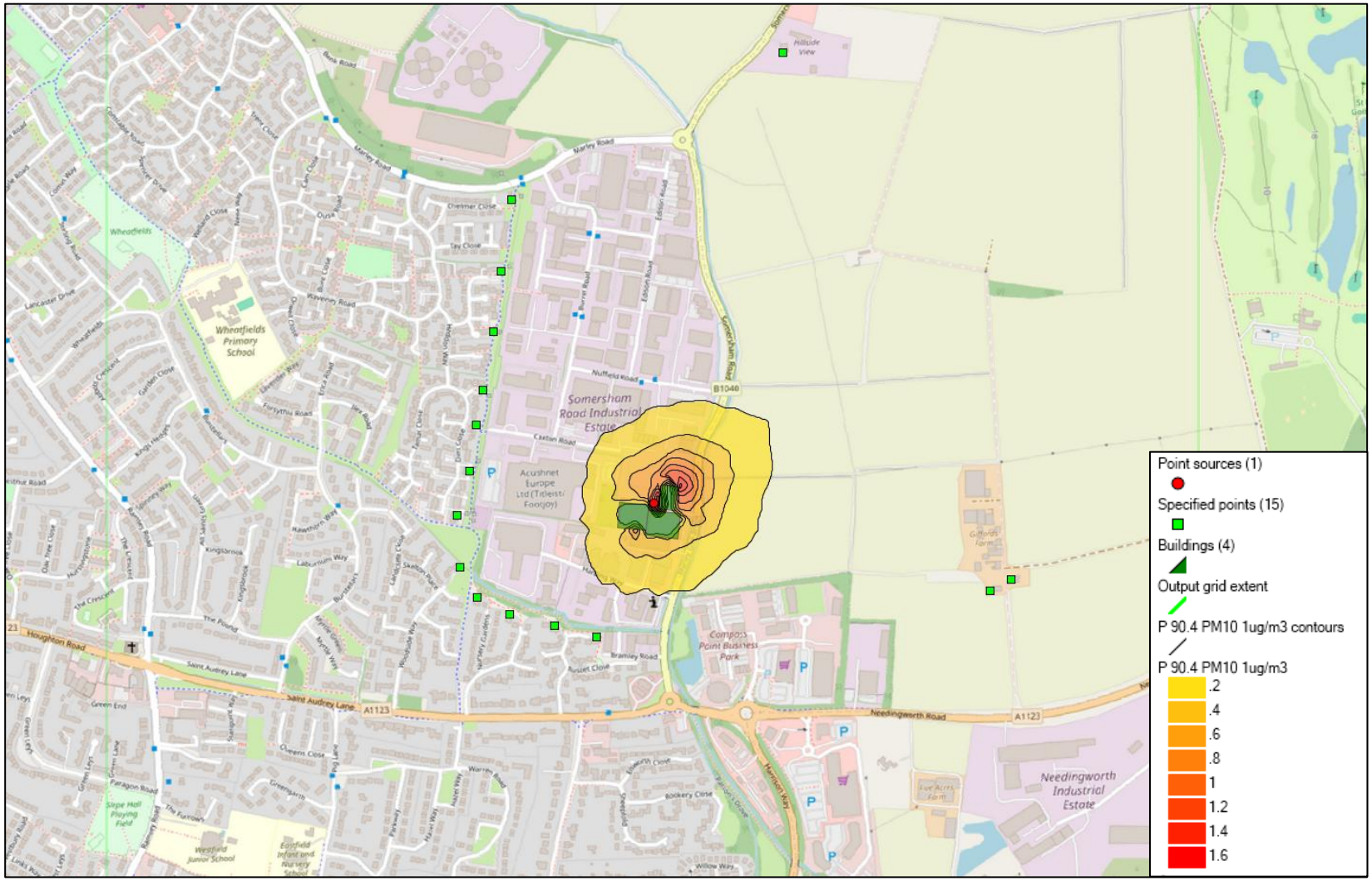


Figure 7 Predicted 24-hour Mean PM_{10} Process Contribution (2025 Meteorological Data)

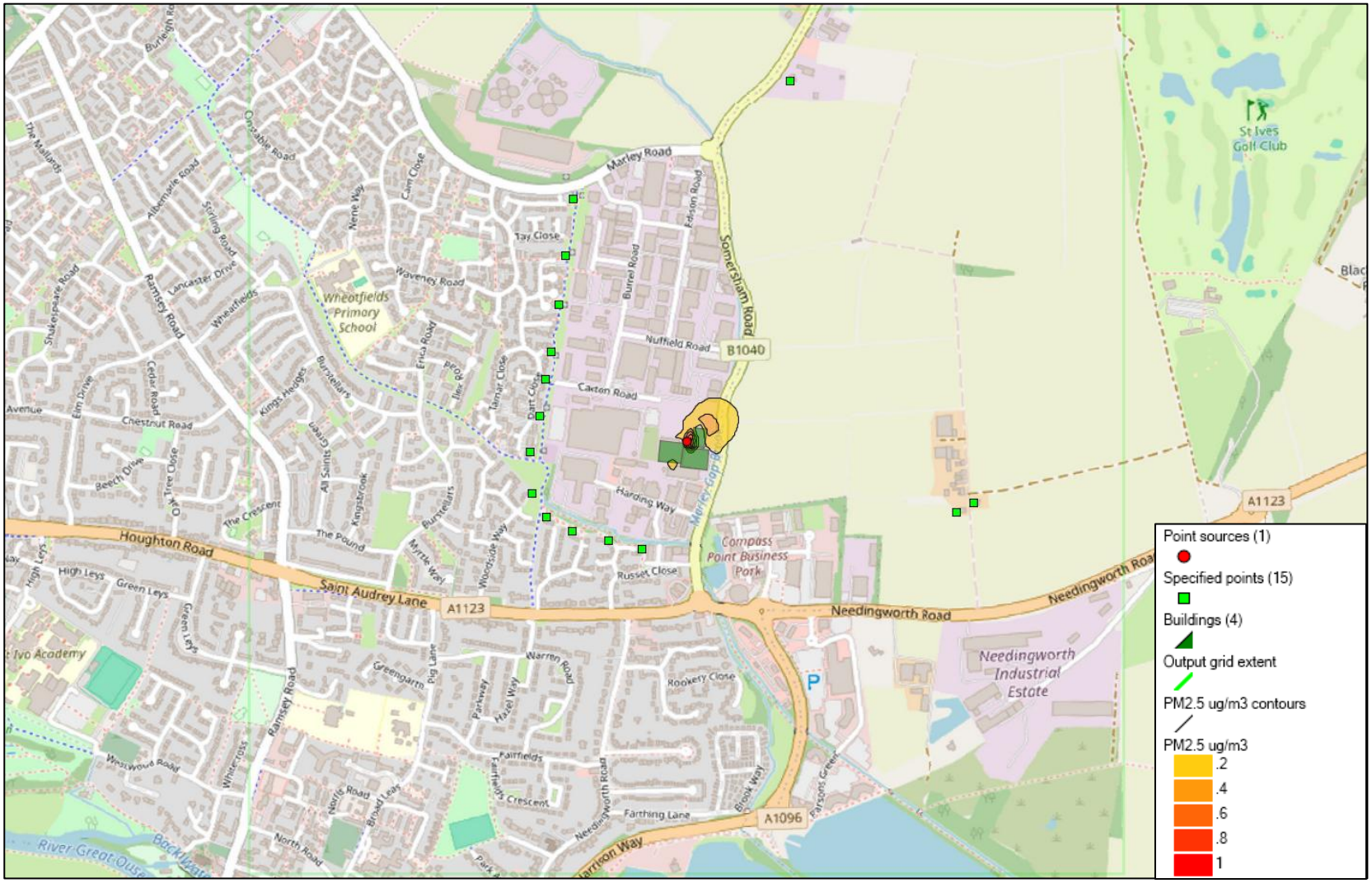


Figure 8 Predicted Annual Mean $PM_{2.5}$ Process Contribution (2025 Meteorological Data)

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APPENDIX B – GLOSSARY

AADT Annual Average Daily Traffic	A daily total traffic flow (24hrs), expressed as mean daily floor across all 365 days of the year.
Adjustment	Application of a correction factor to modelled results to account for uncertainties in the model.
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with the permitted number of exceedances within a specific time scale (see also air quality standard).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	the average (mean) of the concentrations measured for each pollutant for one year.
AQMA	Air Quality Management Area.
AQO	Air Quality Objective.
Conservative	Trending to over predict the impact rather than under predict.
Data Capture	The percentage of all the possible measurements forgiven periods that were validly measured.
Defra	Department for Environment, Food and Rural Affairs.
EFT	Emission Factor Toolkit
Emission rate	The quantity of a pollutant released from a source over a given period of time.
EPUK	Environmental Protection (UK)
Exceedance	A period of time where the concentration of a pollutant is greater than the appropriate air quality standard.
HDV/HGV	Heavy Duty Vehicle/Heavy Goods Vehicle.
IAQM	Institute of Air Quality Management.

LAQM	Local Air Quality Management.
NO_2	Nitrogen dioxide.
NO_X	Nitrogen oxides.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
Road link	A length of road which is considered to have the same flow of traffic along it. Usually, a link is the road from one junction to the next
$\mu g/m^3$ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of $1\mu g/m^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of a pollutant.

NoiseAir Limited

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