VAR6- Air Impact Assessment Report

1. Introduction

This Air Impact Assessment Report has been prepared to support the Environmental Permit Variation application for the installation of four new 1.465 MWth natural gas-fired boilers (Fulton VSRT-125) at the Greene King Brewery site. The purpose of this report is to provide a standalone assessment of the potential air quality impacts associated with the operation of the new boilers, incorporating the findings of the detailed air dispersion modelling carried out by Redmore Environmental Ltd (2025).

This assessment evaluates impacts on human health, local air quality, and designated ecological receptors, in line with the requirements of the Environment Agency (EA) under the Environmental Permitting Regulations (EPR).

The proposed variation does not introduce:

- A change in fuel type
- A change in emission point/stack
- An increase in total thermal capacity
- Any new waste or wastewater streams

The new boilers are modern, energy-efficient, and low-NOx, representing an improvement on existing equipment.

2. Description of Proposed Activity

The proposed variation involves replacing ageing existing boilers with four new 1.465 MWth Fulton VSRT-125 natural gas-fired boilers.

Key characteristics:

- Low NOx design (<20 ppm / 37.8 mg/Nm³)
- Fully modulating burners
- Rated thermal input: 1.465 MWth per unit
- Existing discharge point (stack) retained
- No change to fuel type (natural gas)

Two boilers will typically operate at a time under normal conditions, with the remaining units providing redundancy and additional resilience.

3. Emissions Data for Modelling

Emission parameters used in the detailed dispersion model (based on manufacturer data and verified site monitoring):

Pollutant	**Concentration**	**Notes**
NO_x	19 ppm (37.8 mg/Nm³)	Low-NOx burner design
CO	49 ppm (0.961 mg/Nm³)	Manufacturer data
PM	12.2 mg/Nm³	Estimated via EPA AP-42
VOCs	0.027 mg/Nm³	Manufacturer data

Flue temperature	275°C	High fire
Flow rate	As per boiler spec	Used directly in model

SO_2 and heavy metal emissions are negligible or non-existent due to the use of clean-burning natural gas.

4. Detailed Air Dispersion Modelling Results

(From Redmore Environmental Ltd, 2025)

Modelling was undertaken using the ADMS-6 dispersion model, compliant with EA's air quality modelling requirements.

4.1 Human Health Receptors

Modelled impacts were assessed against UK Air Quality Objectives (AQOs) and Environmental Assessment Levels (EALs).

Findings:

- No exceedances of the annual mean NO_2 objective (40 µg/m³) at any receptor.
- No exceedances of the 1-hour mean NO_2 objective (200 µg/m³).
- Predicted Environmental Concentrations (PECs):
  - Annual mean NO_2 PECs remained below 60% of the AQO.
  - 1-hour NO_2 PECs remained below 35% of the AQO.
- Process Contributions (PCs):
  - Well below the 10% EA insignificance threshold for most receptors.
  - Selected short-term PCs exceeded 10% but PECs remained comfortably below objectives.

Conclusion:
Impacts on human health are not significant.

4.2 Ecological Receptors

Designated sites within screening distance include:

- Breckland SPA (within 10 km)
- Glen Chalk Caves SSSI (within 2 km)
- Moreton Hall Community Woods LNR (within 2 km)
- Horringer Court Caves SSSI

The modelling assessed NOx concentrations, nitrogen deposition, and acid deposition.

Findings:

- NOx concentrations at all ecological receptors were well below critical levels.
- Nitrogen and acid deposition PCs were <1% of critical loads, meeting EA insignificance criteria.
- No exceedances of short-term or long-term critical levels for protected habitats.

Conclusion:
The boiler upgrade does not pose a risk to designated ecological receptors.

5. Comparison with Regulatory Standards

The proposed combustion plant was assessed against the following standards:

Medium Combustion Plant Directive (MCPD)

- NOx ELV: 100 mg/Nm³
- Actual: 37.8 mg/Nm³ → Compliant

BAT-AELs (LCP BREF)

- BAT-AEL for natural gas boilers: 30–85 mg/Nm³
- Actual: 37.8 mg/Nm³ → Within BAT-AEL range

Air Quality Objectives

- All PECs and PCs within acceptable limits and no predicted exceedances.

6. Overall Conclusion

The detailed air dispersion modelling demonstrates that the installation and operation of the four new boilers:

- Will not give rise to significant impacts on human health.
- Will not cause exceedances of air quality standards for NO_2.
- Will not adversely affect designated ecological receptors, including SACs, SPAs, SSSIs, and LNRs.
- Meets all requirements of MCPD, BAT-AELs, and the EPR.
- Represents a modernisation and improvement of existing plant, reducing environmental risk.

The project is therefore considered environmentally acceptable and compliant with EA regulatory expectations.