



Gatwick Airport Northern Runway Project

Environmental Statement

Appendix 13.9.1: Air Quality Results Tables and Figures - Part 3

Book 5

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1 Introduction

- 1.1.1 This document forms Appendix 13.9.1 of the Environmental Statement (ES) prepared on behalf of Gatwick Airport Limited (GAL) for the proposal to make best use of Gatwick Airport's existing runways and infrastructure (referred to within this report as 'the Project').
- 1.1.2 This document sets out air quality results tables and figures which have been taken into account for the assessment in **ES Chapter 13: Air Quality** (Doc Ref. 5.1). Note all locations are provided in cartesian coordinate system, in British National Grid.

2 Odour assessment results

Table 2.1.1: Source Pathway Receptor Assessment

Community area	Source odour potential	Percentage wind speeds at low speeds (<3m/s)	Distance from apron to nearest receptor in community area (m)	Pathway effectiveness	Risk of odour exposure	Receptor sensitivity	Odour risk-based assessment results
Horley Gardens	Medium	9%	300	Moderately effective	Low risk	High	Slight adverse
Povey Cross	Medium	2%	200	Moderately effective	Low risk	High	Slight adverse
Charlwood	Medium	8%	900	Moderately effective	Low risk	High	Slight adverse
Forge Wood and Shipley Bridge	Medium	7%	1000	Moderately effective	Low risk	High	Slight adverse
Horley Gardens	Medium	9%	300	Moderately effective	Low risk	High	Slight adverse
Povey Cross	Medium	2%	200	Moderately effective	Low risk	High	Slight adverse
Charlwood	Medium	8%	900	Moderately effective	Low risk	High	Slight adverse
Forge Wood and Shipley Bridge	Medium	7%	1000	Moderately effective	Low risk	High	Slight adverse
Horley Gardens	Medium	9%	300	Moderately effective	Low risk	High	Slight adverse
Povey Cross	Medium	2%	200	Moderately effective	Low risk	High	Slight adverse
Charlwood	Medium	8%	900	Moderately effective	Low risk	High	Slight adverse
Forge Wood and Shipley Bridge	Medium	7%	1000	Moderately effective	Low risk	High	Slight adverse

3 Central Area Recycling Enclosure (CARE) Sensitivity Analysis

3.1.1 Sensitivity tests have been undertaken using the parameters of the proposed biomass boilers detailed in ES Appendix 13.4.1: Air Quality Assessment Methodology (Doc Ref. 5.3). The following pollutants/ averaging periods have been examined:

- Maximum annual mean oxides of nitrogen (NO_x);
- Maximum 99.79th percentile 1-hour mean NO_x; and
- Maximum 90.41th percentile 24-hour mean PM₁₀.

3.2 Selection of met year (without buildings)

3.2.1 The results show that for 2015 annual mean and 24-hour mean results give the highest concentrations, and 2014 1-hour mean result was the highest amongst other meteorological years.

Table 3.2.1: Sensitivity test results without buildings

Maximum concentrations (µg/m ³)	2014	2015	2016	2017	2018
Maximum annual mean NO _x	4.5	5.6	4.7	5.1	4.0
Maximum 99.79 th percentile 1-hour mean NO _x	74.1	65.3	64.9	63.0	72.4
Maximum 90.41 th percentile 24-hour mean NO _x	13.5	14.9	14.8	14.3	13.4

Note: Stack height was modelled at 18m, in line with the current operating CARE facility.
Emission rate at 1g/s has been used in all pollutants.
Bold denotes the highest result.

3.3 Selection of meteorological year (with buildings, Cargo building as the main building)

3.3.1 The results show that for 2015 annual mean and 24-hour mean results gives the highest concentrations, and 2014 1-hour mean result was the highest amongst other meteorological years.

Table 3.3.1 Sensitivity test results with buildings

Maximum concentrations ($\mu\text{g}/\text{m}^3$)	2014	2015	2016	2017	2018
Maximum annual mean NO _x	18.9	19.0	18.3	18.7	17.8
Maximum 99.79 th percentile 1-hour mean NO _x	146.5	132.1	146.2	137.8	143.6
Maximum 90.41 th percentile 24-hour mean NO _x	27.2	27.3	26.7	1502	25.9
Note: Stack height was modelled at 18m, in line with the current operating CARE facility. Emission rate at 1g/s has been used in all pollutants. Bold denotes the highest result.					

3.4 Selection of met year (without buildings, CARE 2 building as the main building)

3.4.1 The results show that 2014 gives the highest concentrations for all averaging periods assessed.

Table 3.4.1 Sensitivity test results without buildings

Maximum concentrations ($\mu\text{g}/\text{m}^3$)	2014	2015	2016	2017	2018
Maximum annual mean NO _x	21.8	21.1	20.3	20.8	20.1
Maximum 99.79 th percentile 1-hour mean NO _x	146.5	132.1	146.2	137.8	143.6
Maximum 90.41 th percentile 24-hour mean NO _x	30.5	30.0	28.5	28.4	29.1
Note: Stack height was modelled at 18m, in line with the current operating CARE facility. Emission rate at 1g/s has been used in all pollutants. Bold denotes the highest result.					

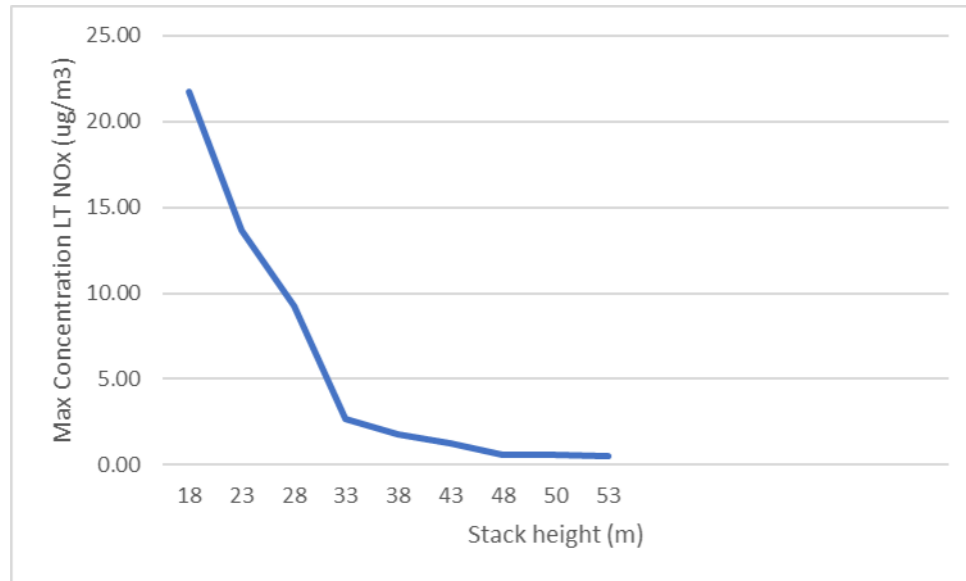
3.5 Results of the sensitivity tests

3.5.1 Across the five years meteorological data used and the consideration of buildings, the results show 2014 with the use of CARE 2 building as the main building (also including other buildings nearby) give the highest concentrations. As such these parameters have been used to inform the stack height assessment.

4 Stack height assessment results

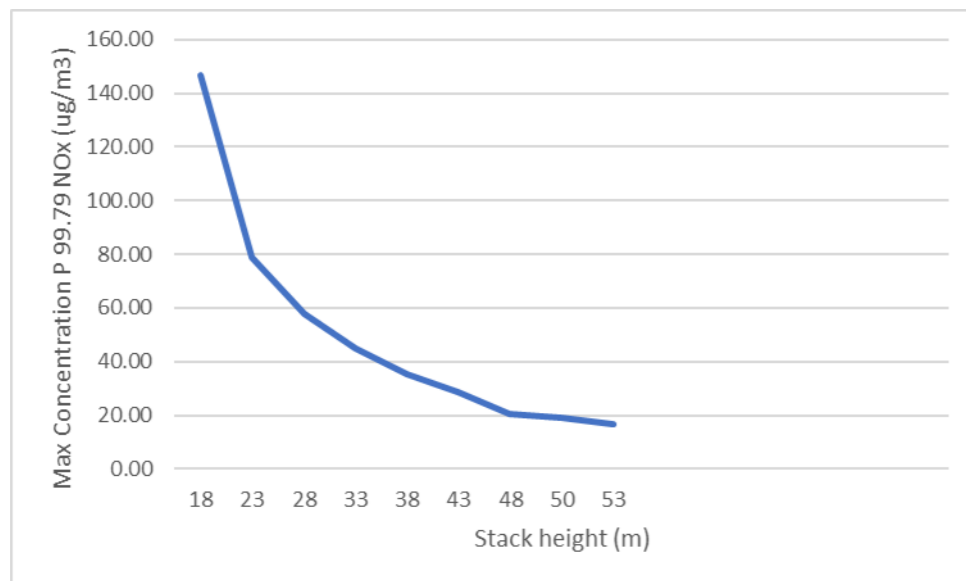
4.1 Annual mean NO_x concentrations (µg/m³)

Diagram 4.1.1 Knee plot for annual mean NO_x concentrations against modelled stack heights at 18m to 53m



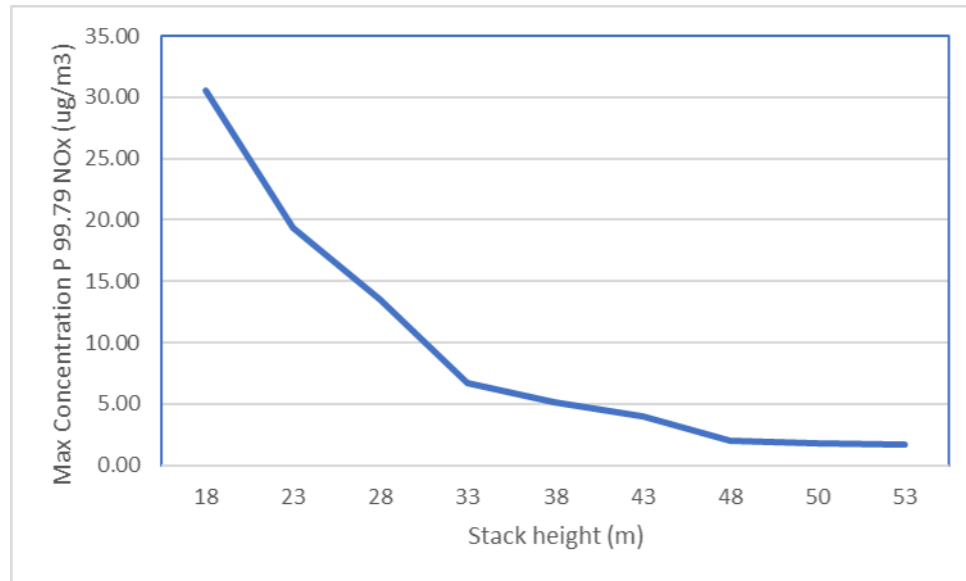
4.2 99.79th p-tile 1-hour mean NO_x concentrations (µg/m³)

Diagram 4.2.1 Knee plot for 99.79th p-tile 1-hour mean NO_x concentrations against modelled stack heights at 18m to 53m



4.3 90.41th p-tile 24-hour mean PM₁₀ concentrations (µg/m³)

Diagram 4.3.1 Knee plot for 90.41th p-tile 24-hour mean PM₁₀ concentrations against modelled stack heights at 18m to 53m



4.4 Results

4.4.1 The above knee plots show predicted maximum concentrations decrease sharply from stack heights at ranges from 18m to 33m. The predicted concentrations are levelled off at stack heights between 48m and 53m (where the decrease of pollutants is less rapid). As such, the stack height for the proposed CARE facility based on the details in **ES Chapter 5: Project Description** (Doc Ref. 5.1) is recommended to be no less than 48m.

5 Glossary

5.1 Glossary of Terms

Table 5.1: Glossary of Terms

Term	Description
EIA	Environmental Impact Assessment
ES	Environmental Statement
GAL	Gatwick Airport Limited – the company which operates Gatwick Airport
NO _x	Nitrogen Oxides
NO ₂	Nitrogen Dioxide
PM ₁₀	Airborne particles that have a median diameter of 10 microns
PM _{2.5}	Airborne particles that have a median diameter of 2.5 microns