Thurrock Flexible Generation Plant

Environmental Statement
Appendix 12.3: Stack Height Determination

Date: February 2020

Environmental Impact Assessment

Environmental Statement

Volume 6

Appendix 12.3

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This report is also downloadable from the Thurrock Flexible Generation Plant website at: http://www.thurrockpower.co.uk

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Summary

This appendix outlines the results of the assessment to determine a suitable stack height.

Qualifications

This appendix has been prepared by Kathryn Barker, a Member of the Institute of Air Quality Management (IAQM) and an Associate Member of the Institution of Environmental Sciences.

It has been checked by Rosemary Challen, a Member of the Institution of Environmental Sciences and Member of the IAQM.

It has been reviewed by Fiona Prismall, a Chartered Environmentalist, Member of the Institution of Environmental Sciences and Fellow of the IAQM. Fiona is the IAQM committee secretary. Fiona was a member of the working groups that produced the IAQM 2014 'Guidance on the assessment of dust from demolition and construction', the EPUK & IAQM 2017 'Land-use Planning & Development Control: Planning for Air Quality' guidance and the IAQM 2019 'A guide to the assessment of air quality impacts on designated nature conservation sites'.

1. Stack Height Determination

1.1 Introduction

1.1.1 A stack height determination has been undertaken to establish the height at which there is minimal additional environmental benefit associated with the cost of further increasing the stack. The Environment Agency removed their detailed guidance, Horizontal Guidance Note EPR H1 (Environment Agency, 2010), for undertaking risk assessments on 1 February 2016; however, the approach used here by RPS is consistent with that EA guidance which required the identification of:

“an option that gives acceptable environmental performance but balances costs and benefits of implementing it.”

1.1.2 The emissions data used in the stack height determination are summarised in Appendix 12.4: Model Inputs and Outputs. Simulations have been run using ADMS 5 to determine what stack height is required to provide adequate dispersion/dilution and to overcome local building wake effects.

1.1.3 As explained in Volume 3, Chapter 12: Air Quality, four scenarios have been considered. For the purposes of the stack height determination, *Scenario 1: 48 x 12.4MW engines, each with their own stack (48 stacks),* has been modelled. This scenario gives the highest predicted concentrations.

1.1.4 The stack height determination considers ground level concentrations over the averaging periods relevant to the air quality assessment, together with the full range of all likely meteorological conditions through the use of five years of hourly sequential meteorological data from Gravesend. The model was run for a range of stack heights.

1.1.5 The dispersion modelling for the purposes of stack height determination assumed a domain of 3 km by 3 km centred on the proposed development and with a grid spacing of 30 m. Results have been reported for the location where the highest concentration is predicted. This is considered a robust and conservative approach.

1.2 Stack Height Determination Results

1.2.1 The stack height modelling results have been analysed by plotting the process contributions against height to determine if there is a height at which no benefit is gained from increases in stack heights.

1.2.2 Figure 1.1 and Figure 1.2compares the maximum predicted annual-mean NO_2 process contribution with the stack heights modelled and compares the maximum predicted 99.79th percentile of hourly-mean NO_2 process contributions with the stack heights modelled.

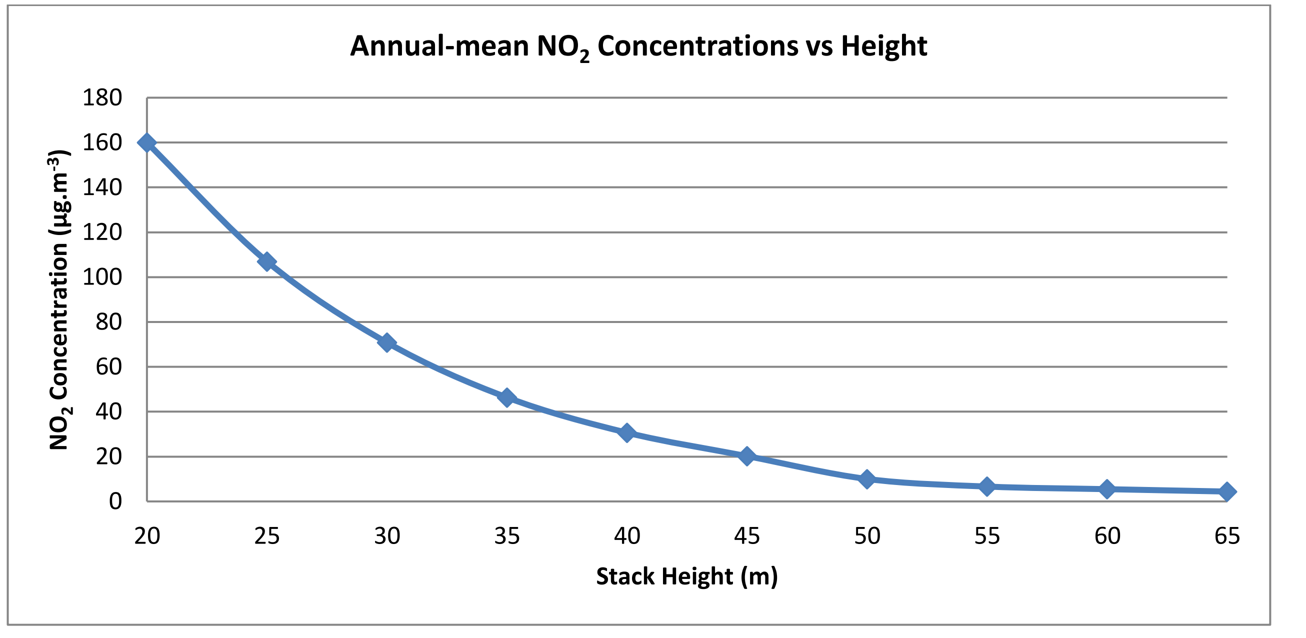

Figure 1.1 Maximum Predicted Annual-mean NO_2 Process Contributions (µg.m-^{3}) vs Stack Height (m)

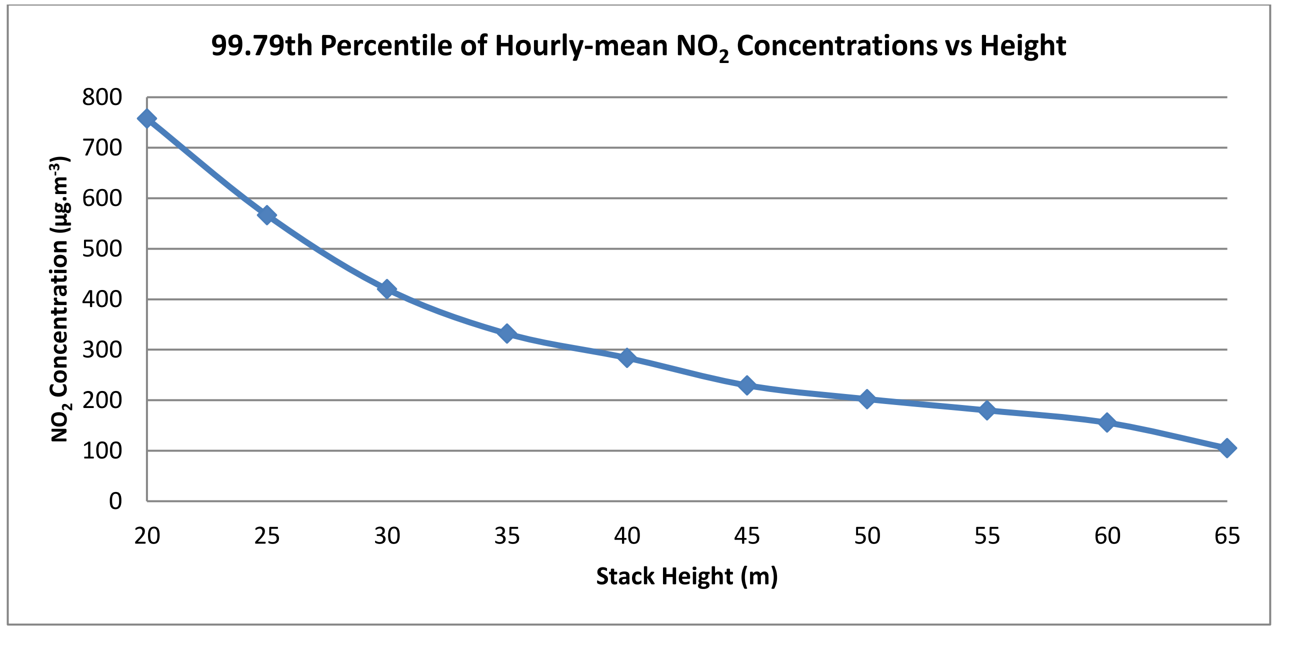

Figure 1.2 Maximum Predicted 99.79th Percentile of Hourly-mean NO_2 Process Contributions (µg.m-^{3}) vs Stack Height (m)

1.2.3 Figure 1.1 and Figure 1.2 indicate that the potential air quality benefits of increasing the stack height diminishes above 50 m. Volume 3, Chapter 12: Air Quality illustrates that with stack height of 40 m, the impacts are not significant.

1.3 Conclusion

1.3.1 Based on the results of the detailed stack height modelling and using professional judgement, a suitable stack height for the assessment is considered to 40 m and the detailed modelling undertaken in this report assumes a 40 m high stack.

2. References

Environment Agency (2010) Environmental Permitting Regulations (EPR) – H1 Environmental Risk Assessment, Annex K. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/448754/H1_2013_consultation_response.pdf [Accessed 07 October 2019]