

1. Summary

A dispersion modelling study of particulate (PM₁₀) emissions from Hepworth's Sand Drying Plant at Leziate near King's Lynn has been carried out using the ADMS 3 model (version 3.0.6.0).

The First Stage Review and Assessment identified the plant as a significant source of PM₁₀. The Borough Council of King's Lynn and West Norfolk has therefore commissioned CERC to carry out dispersion modelling of PM₁₀ for this site.

The approach used in this study is commensurate with the approach outlined in LAQM.TG4(00) to be used for the Third Stage Review and Assessment. The study has involved a detailed and robust assessment of the potential impacts, and the assumptions made have been considered in depth to give confidence in the results and in the conclusions drawn from them.

Modelling was carried out using one year of hourly sequential meteorological data from Marham, measured during 1993, the most recent year for which suitable meteorological data are available. This meteorological site is situated about 15km south east of the modelled source and so these data will give a good representation of the meteorological conditions at the site. Concentrations have been calculated for comparison with Air Quality Strategy (AQS) objectives. The AQS objectives are targets to be achieved by the year 2004.

For the foundry dryer running in dryer mode, the highest predicted 90.14th percentile of 24 hour average concentrations of PM₁₀ is 50µg/m³, compared to the AQS objective of 50µg/m³. The predicted annual average concentration of PM₁₀ is 18µg/m³, compared to the AQS objective of 40µg/m³. When the background concentration of 24µg/m³ is taken into account, the maximum predicted concentrations of PM₁₀ exceed the objective values. However, these maximum values are only predicted to occur very close to the modelled buildings on the site, being caused by entrainment of PM₁₀ around the buildings. The concentrations predicted off the site are very much lower than the maximum values. Off the site, typical maximum values for the 90.14th percentile and the annual average are 5µg/m³ and 2µg/m³ respectively.

For the foundry dryer running in combined dryer/cooler mode, the highest predicted 90.14th percentile of 24 hour average concentrations of PM₁₀ is 63µg/m³, compared to the AQS objective of 50µg/m³. The predicted annual average concentration of PM₁₀ is 22µg/m³, compared to the AQS objective of 40µg/m³. When the background concentration of 24µg/m³ is taken into account, the maximum predicted concentrations of PM₁₀ exceed the objective values. However, as before, the concentrations predicted off the site are very much lower than the maximum values. Off the site, typical maximum values for the 90.14th percentile and the annual average are 10µg/m³ and 5µg/m³ respectively.

Note that since the five sources, which have been modelled as running continuously throughout the year, are each only in operation for up to 70 hours per week, and in the case of the foundry dryer for as little as 24 hours per week. The results given here therefore represent the worst possible situation, as all five sources are unlikely to be in operation at the same time when the worst meteorological conditions occur. In particular, the actual annual average will be not more than half the value predicted, as each source is in operation for less than half the year.