Nitrogen dioxide (annual mean)

The estimation of NO_2 concentrations near roads is not straightforward. In order to ensure that an appropriate and pragmatic method was selected for the M4 East assessment, a review of the literature and data was undertaken, and analysis of local monitoring data was conducted. Various air quality guidance documents recommend the use of local monitoring data to estimate NO_2 concentrations, where such data are available. Empirical methods for converting NO_X to NO_2 were developed specifically for the M4 East assessment. These methods are documented in Appendix G.

For both the community and RWR receptors, the annual mean NO_X concentration from GRAL was added to a mapped background NO_X concentration. The total annual mean NO_X concentration was then converted to a total annual mean NO_2 concentration using an empirical function.

For both types of receptor the annual mean NO_2 concentration during the modelled year was compared with the corresponding air quality criterion.

Nitrogen dioxide (maximum one-hour mean)

For community receptors a contemporaneous approach was used. The one-hour mean NO_X concentration from GRAL was added to the corresponding one-hour mean background NO_X concentration for every hour of the year. Each total one-hour mean NO_X concentration was then converted to a maximum one-hour mean NO_2 concentration using an empirical function. The maximum one-hour NO_2 concentration for the year was then determined.

For RWR receptors the maximum one-hour mean NO_X concentration for the year was added to the 98th percentile one-hour mean background NO_X concentration from the synthetic profile (236 µg/m^3). The total NO_X concentration was then converted to a maximum one-hour NO_2 concentration. The implications of this simplified approach were investigated by comparing the 'statistical' method using the 98th percentile background NO_X with the contemporaneous method for the 31 community receptors. The results of this comparison are presented in Figure 8-20. There was a reasonably good agreement between the two approaches, with the statistical method resulting in (on average) slightly lower maximum NO_2 concentrations than the contemporaneous method.

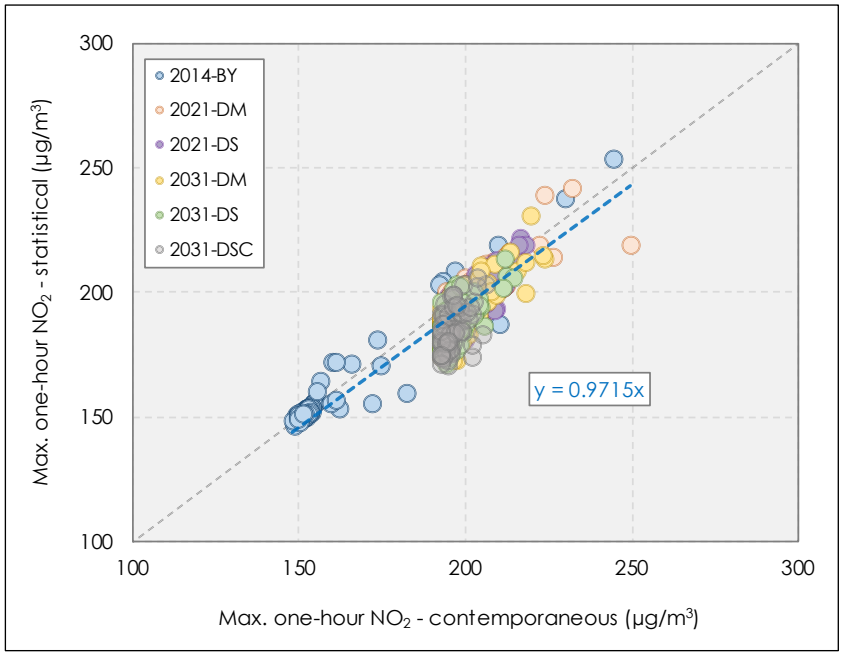

Figure 8-20 Comparison between statistical and contemporaneous approaches for calculating maximum one-hour NO_2 at community receptors (note that axes do not start at zero)

For both types of receptor the maximum one-hour NO_2 concentration during the modelled year was compared with the corresponding air quality criterion.