Stage 4 Review and Assessment for the London Borough of Richmond upon Thames

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Appendix F

1 Air Pollution Measurements in London

1.1 Monitoring Update

Details of the monitoring undertaken at comparable sites across the LAQN, as well as the Government's AURN were provided in the Stage 3 report. At the time of the preparation of that report, ratified data were only available up to 1997. These data can now be supplemented with more recent results.

1.2 Nitrogen dioxide

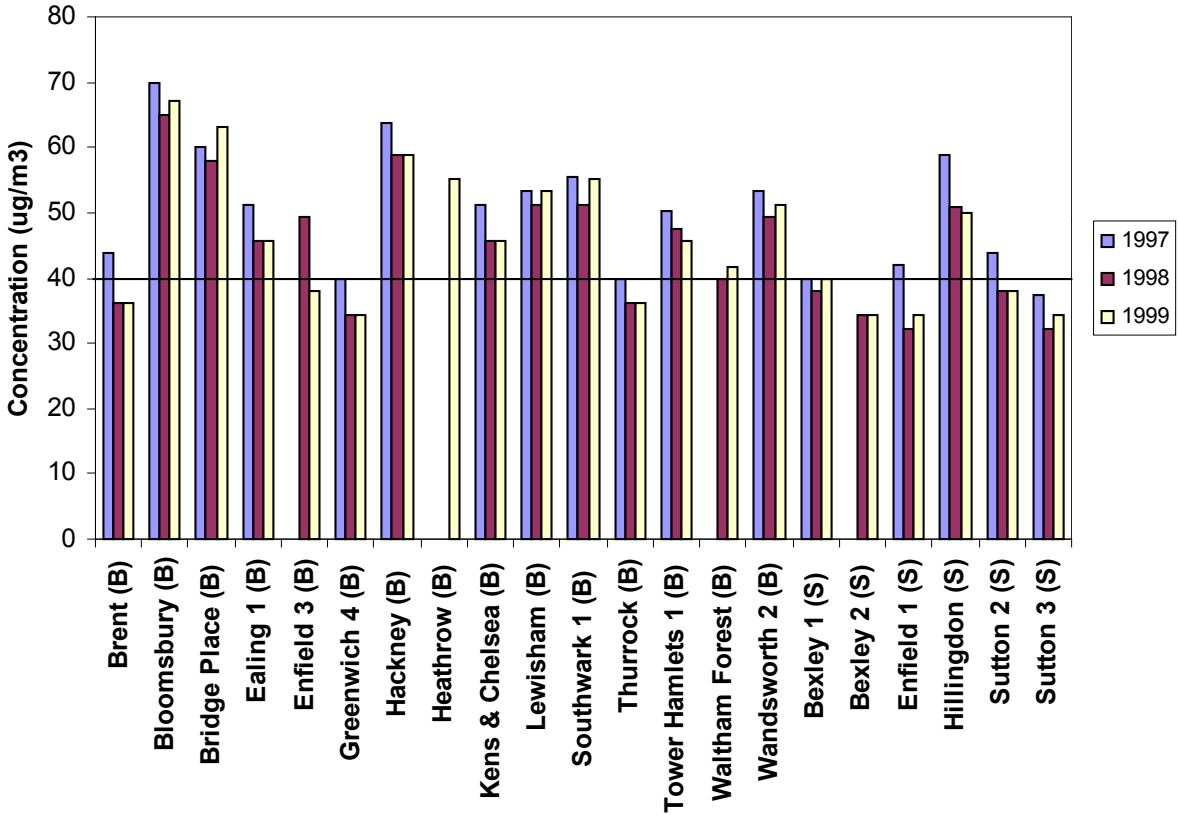

Figure 16 Annual average NO_2 means for background and suburban sites (1997-9)

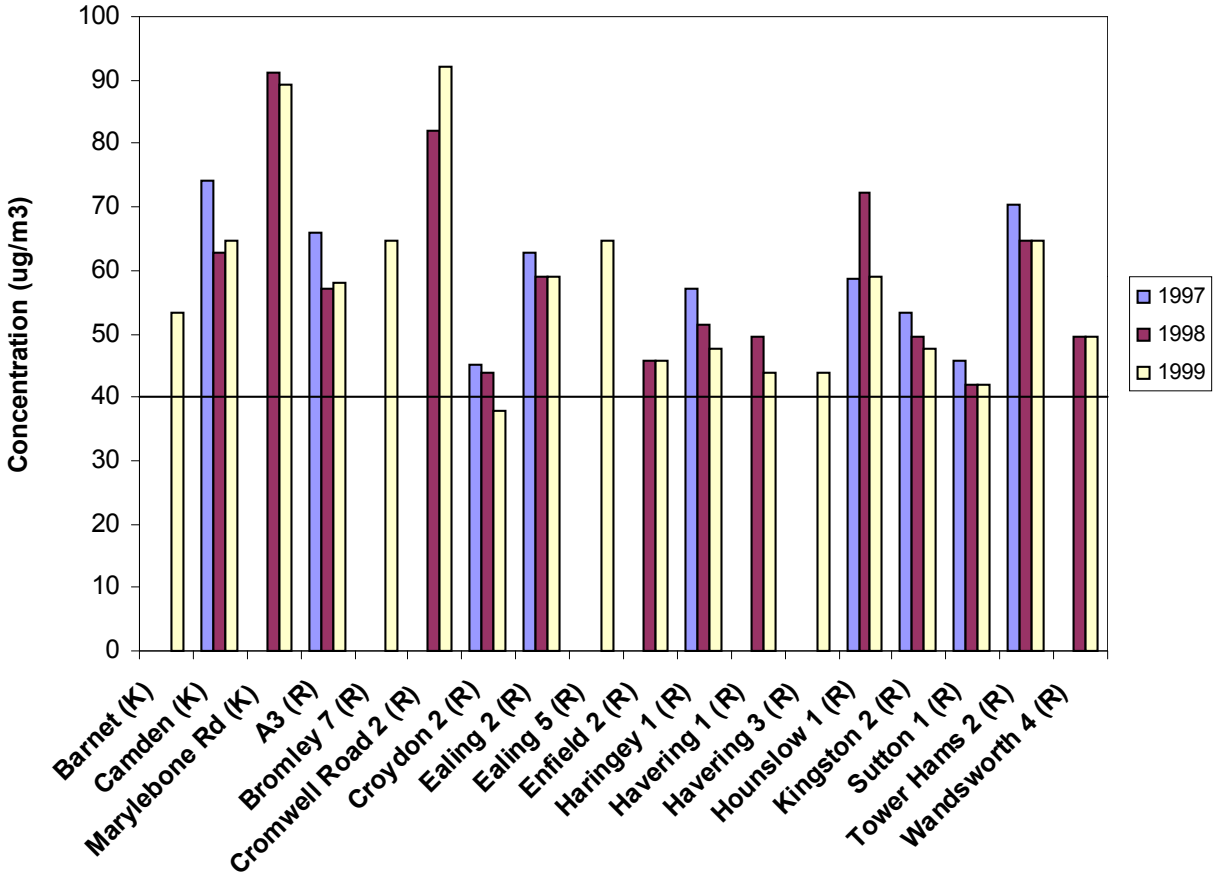

Figure 17 Annual average NO_2 means for kerbside and roadside sites (1997-9)

These figures update the information in the Stage 3 report and highlight that exceedences of the NO_2 annual mean objective have continued at all kerbside (K) and roadside sites (R) (apart from Croydon, which if monitoring uncertainty is taken into account will exceed the objective). Similarly the majority of background sites (B) also exceed the objective apart from some sites in outer London (e.g. the Brent, Greenwich and Thurrock sites). The suburban sites (S) mostly do not exceed the objective, with the exception of Hillingdon and Bexley.

The figures suggest that the pollution for 1999 was marginally better than 1997, which was considered the worst-case year for NO_2. However it is not possible to conclude without further investigation, whether this was from either an emissions reduction (of NO_x) or as a result of the meteorology or a combination of these factors.

It is also worth noting that during 1999 there was an absence of the major pollution incidents seen in previous years. For example, during 1994 and 1997 London experienced significant winter pollution incidents, a prolonged secondary particulate episode occurred during 1996 and the hot summer of 1995 produced

substantial photochemistry. However, the summer of 1999 was characterised by a series of moderate photochemical episodes.

To further understand the effect of changing pollution climates over time it is possible to start to consider the relative results from 1995 to 1999. Data from November 1995 to September 2000 have been analysed to place the results from 1999 in context. Rolling annual means from November 1996 have been calculated in an attempt to eliminate seasonal effects. Note that the mean value for a particular date represents that for the preceding year e.g. the value calculated for November 1996 represents the mean between November 1995 and November 1996. To provide a perspective across the network as a whole, the rolling means from each of the long term sites have been averaged to produce a LAQN rolling mean, normalised to 100 % for each pollutant as at November 1996 to illustrate relative change. Measurements from roadside and background sites have been used. However, due to data availability, a different set of sites has been used for each pollutant. Twelve sites have been used for the rolling NO_X and NO_2 calculation. (NOx is the sum of NO and NO_2). It should be noted that data from summer 2000 are still subject to ratification.

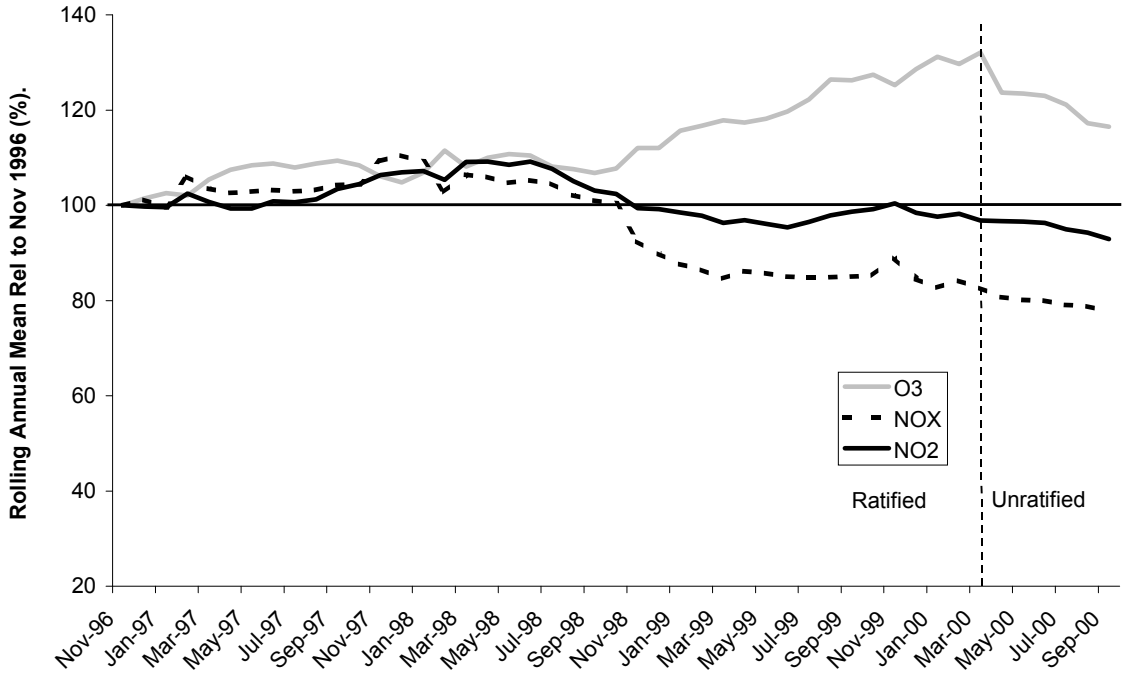

Figure 18 Relative Rolling Annual LAQN Means for O_3, NO_X and NO_2

Figure 18 shows a fall of around 23 % in the NO_X concentration over the period November 1996 to September 2000. This is very likely the result of reduced NO_X emissions due to technological changes in the vehicle fleet. The effects of pollution incidents during autumn 1997 can also be clearly seen in the NO_X concentration, causing a rise in concentration at this time and a consequential fall during autumn

1998 as this incident drops from the rolling annual mean. The overall fall in NO_X concentrations has not been matched by those of NO_2, which show little change over the period, although data that are yet to be ratified suggested a decline during the summer of 2000. This decrease might be linked to the relatively poor summer weather rather than being part of a long-term trend. The overall stability of NO_2 concentrations, in the face of NO_X reductions, is of profound importance to air quality management strategies.

The behaviour of NO_2 over the period begs the question whether the rate of decline is sufficient to achieve the objective by 2005. Clearly the required reduction in NO_2 concentrations is different at each site, dependent on its annual mean at the start of the period of analysis. To illustrate this, target rates of reduction have been derived for four sites in London. For illustrative purposes these are assumed to be constant. The rolling annual LAQN mean NO_2 is shown compared to these target reduction rates in Figure 19.

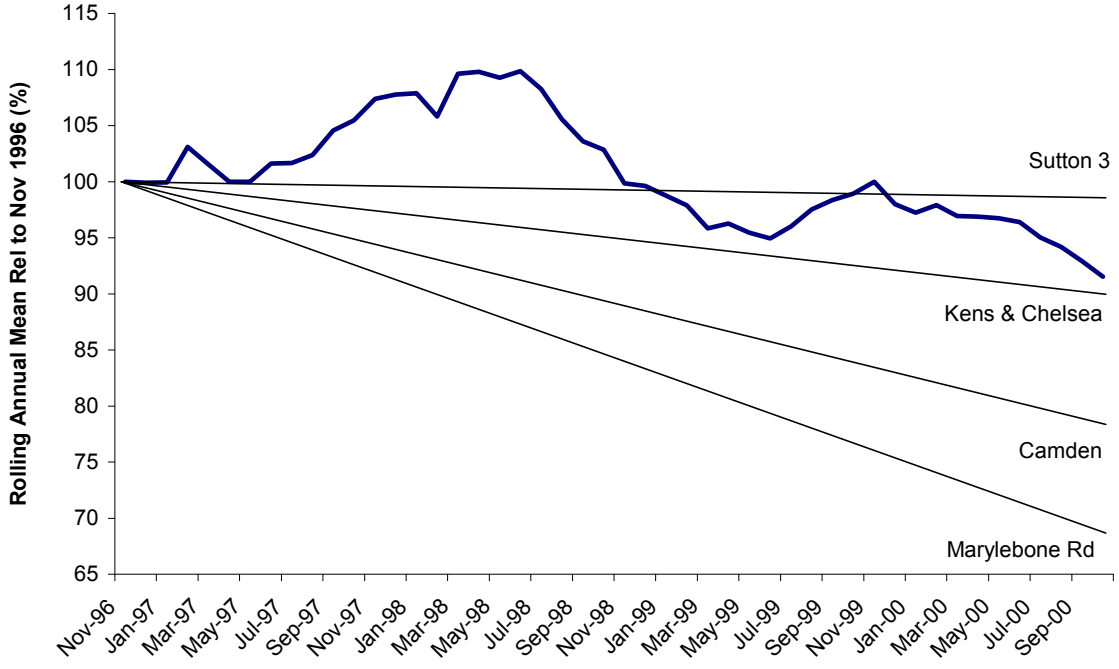

Figure 19 Relative Rolling Annual LAQN Means for NO_2 and target reduction rates for 4 sites.

Figure 19 suggests that the rate of change in NO_2 concentration seen over the previous 4 years may be sufficient to achieve the AQS objective at outer London suburban sites such as Sutton 3. The rate of change is approaching the rate at which inner London background sites will achieve the objective. The background site at Kensington & Chelsea illustrates this. It is evident that a greater rate of reduction will be required if inner and central kerbside sites, such as Camden and Marylebone Road, are to meet the objective by 2005.

1.3 Particles (PM10)

The following figure updates the PM10 concentrations monitored at London sites for the period 1997 to 1999. These measurements indicate that the objective levels of PM10 are reducing at most sites. The only site, which exceeded the objective in 1999, was the Marylebone Road site. The Marylebone Road site also exceeded in 1998 as did the A3 roadside site. Background sites exceeded the objective in 1997 only (apart from Kensington and Chelsea and Brent), as did the roadside and kerbside sites.

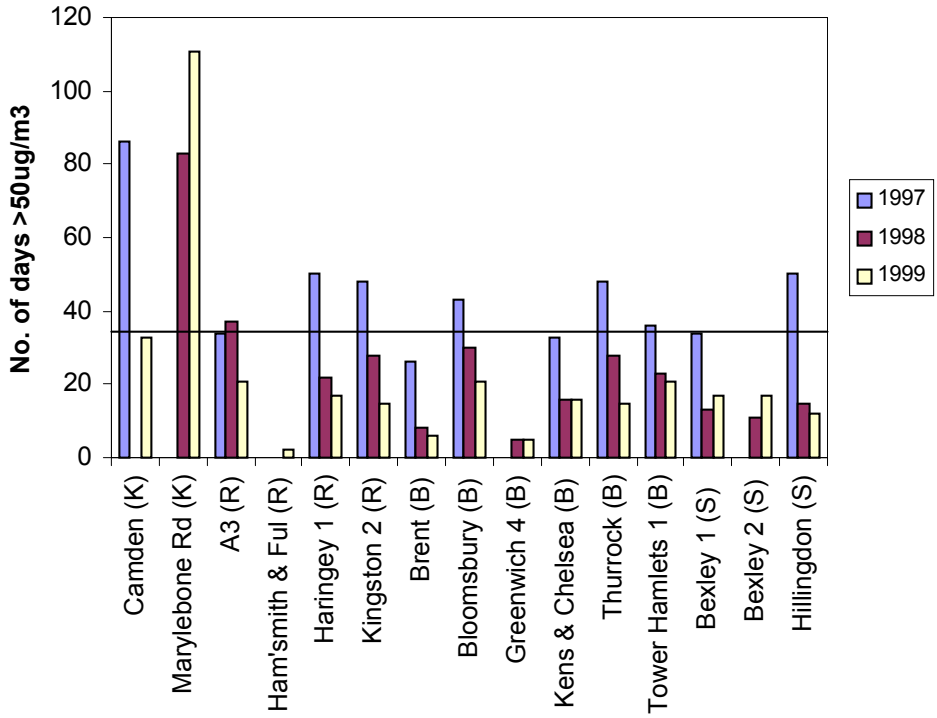

Figure 20 Days exceeding 50µg/m^3 for sites (1997-9)

The reduction in PM10 can also be seen to fall in the following diagram, which shows approximately a 30% in the rolling annual mean for PM10 since 1996. Four sites have been used for the rolling PM10 calculation.

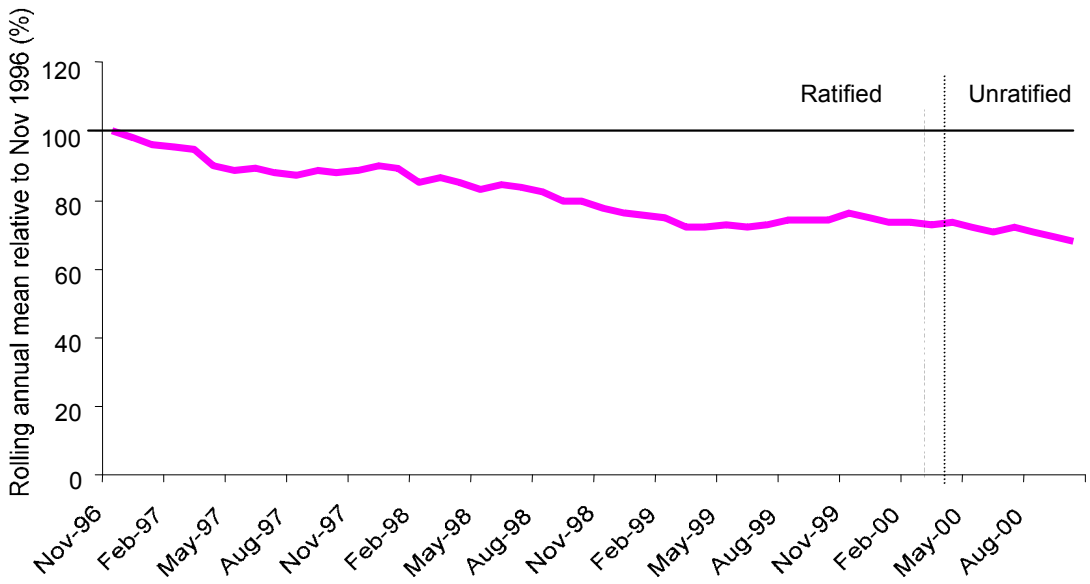

Figure 21 Relative Rolling Annual LAQN Means for PM10