Review and Assessment: The Experiences of the First Phase Authorities

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Review and assessment is to be a three stage activity with the cost and complexity of the assessment increasing with each stage. Only those authorities for which the risk of exceedance of an air quality objective by the end of 2005 is significant will need to progress beyond stages 1 and 2. Much of the work described in this summary of the First Phase Studies could form part of a third stage review for the Authorities' areas.

The Government has provided detailed guidance on the first and second stages of review and assessment (Pollutant-Specific Guidance) (DETR *et al*, 1998b). This guidance was at a very early stage of preparation when the First Phase Studies took place and the authorities were given a copy of the available draft and were able to assess the procedures being developed and comment on them. These comments were useful in the process of developing the guidance.

7.1 FIRST STAGE

The first stage of review and assessment is a desk-based information gathering exercise. The guidance for this was reasonably complete for carbon monoxide, benzene, 1,3-butadiene and lead and several of the First Phase Authorities completed the first stage review and assessment for these pollutants.

Figure 7.1 shows a map of Liverpool with potentially significant sources of these pollutants marked. These consist of major roads and several industrial processes, both Part A and Part B. For lead, for example, four Part B processes were identified that could be significant sources: two scrap furnaces and two galvanisers. It was recognised that a second stage review and assessment would be required but that insufficient resources were available at that time to complete the task.

St Helens, another authority in the Merseyside group, identified a Part A process that could be a significant source of carbon monoxide and would require a second stage review. An industrial gases plant emits CO during reforming of gas for the glass industry. In this case, a modelling assessment had already been completed as part of the IPC application process and showed that levels of CO would be below the air quality objective.

7.2 SECOND STAGE

The Design Manual for Roads and Bridges plays a pivotal role in the Second Stage review. Most of the First Phase Authorities used the 1984 version of DMRB to assess major roads in their areas which was the most up to date version at the time. Table 7.1 shows an example of a DMRB assessment for CO, for the M3 motorway in Eastleigh, Hampshire. The assessment provides a maximum 8 hour concentration both for the current year and for 2005. In this case, DMRB predicted that the objective (10 ppm) will not be exceeded at present at this location and that the 8 hour maximum in 2005 will be well within the objective, despite a forecast peak hour flow of more than 10,000 vehicles in 2005.

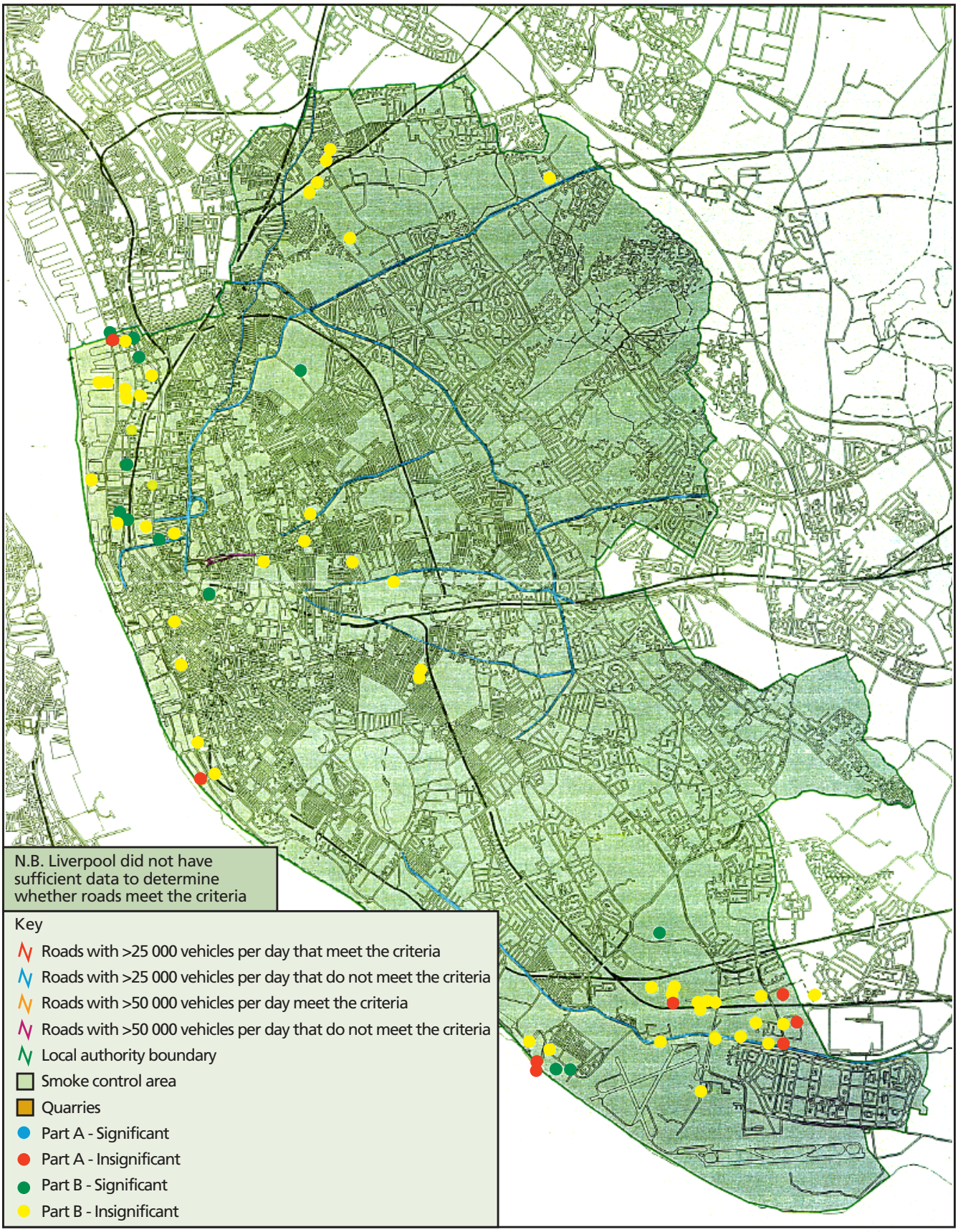

Figure 7.1. A map of Liverpool showing significant sources of air pollution identified in a first stage review and assessment.

TABLE 7.1. DMRB (1984 VERSION) ASSESSMENT OF THE M3 IN EASTLEIGH, HAMPSHIRE

Pollutant	CO
Road	M3
distance to receptor (m)	40
Year	1995

	light duty vehicles	heavy duty vehicles
peak hr flow	7267	1183
Avg speed (km/hr)	80	50
Emissions relative to 1995 LDV	1	0.732
speed correction factor	0.95	1.06
Effective flow	6904	918

mean peak hour concentration (ppm)	1.55
annual 8-hr maximum (ppm)	4

Pollutant	CO
Road	M3
distance to receptor (m)	40
Year	2005

	light duty vehicles	heavy duty vehicles
peak hr flow	9374	1526
Avg speed (km/hr)	80	50
Emissions relative to 1995 LDV	0.197	0.638
speed correction factor	0.95	1.06
Effective flow	1754	1032

mean peak hour concentration (ppm)	0.55
annual 8-hr maximum (ppm)	1.5

Editors' Concluding Remarks

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This report describes some aspects of the First Phase Authorities work that the editors have selected to illustrate particular aspects of air quality review and assessment. Some excellent work may not have been given the emphasis it deserves and we apologise to the authors for this. Anyone who wishes to see the individual reports should contact the local authority concerned.

All the First Phase Groups met with success and some disappointment. Emissions inventory work seemed to be particularly problematic although the Groups were overly self-critical: all the groups working on emissions inventories produced data that were more detailed than those available from the National Atmospheric Emissions Inventory, albeit at a large cost in officer's time.

Monitoring exercises were a notable success. Several new kerbside monitoring stations were established and we now have far more detailed data on air quality in the most polluted locations than we had previously. Measurements around industrial sites demonstrated the need for careful review and assessment in such locations, particularly for sulphur dioxide, particles and, perhaps, lead.

While we can accurately measure current air quality it will be more difficult to predict future air quality sufficiently accurately with dispersion models. The various models used by the First Phase Authorities did not agree particularly well with each other or with measurements. However, models must have a place in Stage 2 and preliminary Stage 3 air quality screening exercises and it should be remembered that, while it is relatively easy to see where the most polluted location is at the kerbside and so measure air quality there, a model is needed to assess the spatial variation in stack impacts.

Urban air quality management tools proved capable of investigating the relative outcomes of various emissions scenarios but the absolute values of the predicted concentrations require further verification against measurements. The most advanced of the modelling tools used is very data intensive, requiring hour by hour emissions from road transport, industrial and other sources as well as hourly meteorology. Given this information, however, very detailed air quality predictions can be derived

References

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