

AIR QUALITY, CLIMATE CHANGE AND NOISE

AIR QUALITY

LTP Objective: "To improve environmental quality and reduce the impacts of transport pollution on air quality and noise"

Transport: A Major Source of Urban Air Pollution

1. It is widely accepted that road transport is the most significant source of air pollution in urban areas in the UK. This is not surprising as the National Vehicle Fleet (NVF) currently exceeds 26 million vehicles, which collectively travels over 460 billion vehicle kilometres / year. The size and distance travelled by the NVF, continues to increase. Table 1 provides a summary of the transport contribution to total UK emissions.
2. In urban areas, the transport contribution to emissions is much higher than shown in Table 1 with 97%, 75% and 50% respectively for carbon monoxide, nitrogen dioxide and particulates. This is due to the concentration of road traffic and local congestion in urban areas.
3. Other significant sources of air pollution include power generation, industry and the domestic sector. To combat this problem, the UK government has developed national air quality frameworks and guidance for local air quality management.

Benzene	1,3 Butadiene	Carbon Monoxide	Lead	Nitrogen Oxides	Particulates	Sulphur Dioxide	Volatile Organic Compounds
66%	68%	75%	73%	47%	26%	2%	32%

Table 1: UK Transport Contribution of Pollutant Emissions (1998) [Source: DETR Air Quality Strategy (Jan 2000)]

The National Air Quality Strategy 2000

4. The National Air Quality Strategy (NAQS) 1997 (Part IV of The Environment Act 1995) identified initial standards and objectives to be achieved by the year 2005. A recent review, based on the latest scientific and medical research, has resulted in revised air quality objectives being published in NAQS 2000. The new air quality objectives are summarised in Table 2 and have been legally adopted as the Air Quality (England) Regulations 2000.
5. A series of technical guidance notes on Local Air Quality was produced by the DETR, to assist Local Authorities in the delivery of their Air Quality Reviews. The latest guidance was published in March 2000 and includes: Monitoring Air Quality, Estimating Emissions, Selection & Use of Dispersion Models and Pollutant Specific Guidance.
6. All the West Yorkshire Local Authorities have complied with the NAQS 2000 requirements by producing "Stage 1 and 2" Air Quality Review and Assessment Reports. The findings of these reports indicate that all Districts are likely to comply with the relevant air quality objectives for Benzene, 1,3 Butadiene, Lead, Carbon Monoxide

and Sulphur dioxide¹. However, both nitrogen dioxide and particulates (PM₁₀) have been highlighted as pollutants of concern, where relevant air quality objectives may be exceeded in some urban areas. Road transport is a major source of both these pollutants.

7. Work is currently underway on the relevant Stage 3 assessments. This involves a combination of detailed monitoring and modelling techniques to assess both existing and future nitrogen dioxide and particulate air quality. Exceedance of any air quality objective would require the setting up of an Air Quality Management Area (AQMA). DETR guidance document LAQM.G1(00) 'Framework for review and assessment of air quality' suggests that the final stage of the review and assessment process should be completed by June 2000. A further 3-month period has been allocated for appropriate consultations with interested parties, prior to the designation of an AQMA. These timescales will be difficult to meet. However, most West Yorkshire Local Authorities should complete the process before the end of the year 2000.

Pollutant	Air Quality Objective Level	Air Quality Objective Dates
BENZENE	16.25 micrograms/m ³ (running annual mean)	31 st Dec 2003
1,3 BUTADIENE	2.25 micrograms/m ³ (running annual mean)	31 st Dec 2003
CARBON MONOXIDE (CO)	11.6 milligrams/m ³ (running 8 hour mean)	31 st Dec 2003
LEAD (Pb)	0.5 micrograms/m ³ (annual mean)	31 st Dec 2004
	0.25 micrograms/m ³ (annual mean)	31 Dec 2008
NITROGEN DIOXIDE (NO ₂)	200 micrograms/m ³ (1 hour mean) *1	31 st Dec 2005
	40 micrograms/m ³ (annual mean)	31 st Dec 2005
PARTICULATES (PM ₁₀)	50 micrograms/m ³ (24 hour mean) *2	31 st Dec 2004
	40 micrograms/m ³ (annual mean)	31 st Dec 2004
SULPHUR DIOXIDE (SO ₂)	125 micrograms/m ³ (24 hour mean) *3	31 st Dec 2004
	350 micrograms/m ³ (hourly mean) *4	31 st Dec 2004
	266 micrograms/m ³ (15 minute mean) *2	31 st Dec 2005
KEY *1 - not to be exceeded more than 18 times/year *2 - not to be exceeded more than 35 times/year *3 - not to be exceeded more than 3 times/year *4 - not to be exceeded more than 24 times/year		

Table 2: Summary of the National Air Quality Objectives [Source: DETR Air Quality Strategy (Jan 2000)]

¹ At present, several districts are at risk of exceeding the sulphur dioxide objective. The main source of sulphur dioxide is from power generation in the Vale of York and the Trent valley. The Environment Agency state mitigation measures, including cleaner fuels and desulphurisation will ensure compliance by the relevant objective date.

8. The time scales of the LAQM process are unfortunate, as details of potential AQMAs cannot be specified for inclusion within the first full Local Transport Plan. Any AQMAs identified will therefore be reported in future Annual Progress Reports along with appropriate transport action plans. However, allowance has been made within the funding bid for these action plans. Also, expenditure under other headings, for example on updating urban traffic management and control systems, will be relevant to the action plans.

The EU Auto-Oil Programme

9. The EU Auto-Oil Programme and associated legislation has had a significant effect in raising standards in all member states in terms of improving fuel quality and tightening vehicle emission standards. In the UK, these initiatives are likely to reduce the NVF emissions of nitrogen dioxide and particulates (PM₁₀) by around 35-40%, between the present date and the year ending 2005.

10. Despite these improvements, sophisticated dispersion modelling of transport and other emission sources indicate that some major conurbation's and areas close to heavily trafficked motorways within West Yorkshire are at risk of exceeding relevant air quality objectives. The average annual objective for nitrogen dioxide is most vulnerable. Additional transport measures appear necessary to further reduce emissions of nitrogen dioxide and particulates. (Full details of the West Yorkshire Authorities monitoring and modelling data can be found in the Annual Progress Report)

Transport Initiatives to Improve Air Quality

11. Figure 1 provides a summary of the LTP measures that should reduce vehicle emissions of NO₂, PM₁₀ and help improve local air quality. All initiatives have been suffixed according to their present status and grouped into 3 major themes.

Traffic Demand Management Techniques

12. The traffic demand management techniques refer to priority measures that will encourage the use of Public Transport and reduce car dependency. The priority measures aim to improve the quality and speed of a commuter journey, thereby providing an efficient alternative to the car. Such measures should reduce the number of vehicles entering urban areas, leading to an overall reduction in vehicle emissions.

Reduce Need to Travel

13. This approach involves raising awareness of the environmental impacts generated by car use, particularly during peak periods. Careful planning of new developments and influencing travel behaviour can improve travel efficiency and reduce travel needs. Similar to demand management techniques, these measures will help reduce car dependency and aid improvements in air quality.

Actions to Reduce Vehicle Emissions

14. These actions refer to a variety of technological improvements / legal enforcement's that will lead to a reduction in vehicle exhaust emissions but would have little effect on travel behaviour.

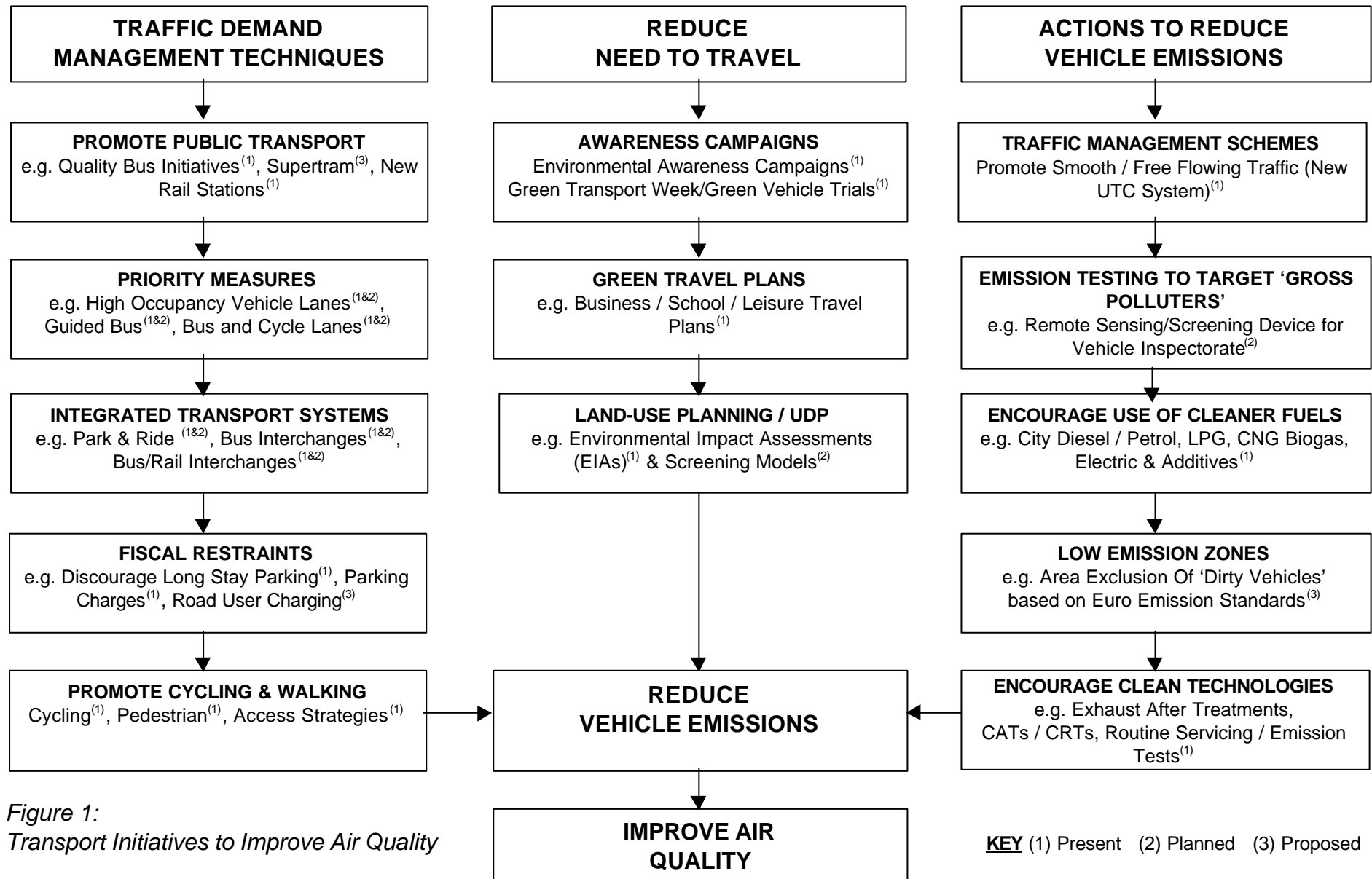


Figure 1:
Transport Initiatives to Improve Air Quality

KEY (1) Present (2) Planned (3) Proposed

CLIMATE CHANGE

LTP Objective: "To contribute to national and international efforts to reduce the contribution of transport to overall greenhouse gas emissions."

16. Climate Change is probably the biggest environmental challenge facing us all. The most widespread of the so-called greenhouse gases is carbon dioxide and this is produced principally from the burning of fossil fuels. These gases are building up in the upper atmosphere and are causing the average temperature of the planet to rise steadily. Although the effects of global warming are unpredictable, it is considered to be responsible for the rise in sea levels and increased frequency of extreme weather events.

17. World leaders have met to consider how we should address this threat. This has led to the UK being committed to a legally binding target to cut greenhouse gases by 12.5% below 1990 levels over the period 2008-2012. The Government is also committed to cut CO₂ emissions to 20% below 1990 levels by 2010 as stated in its manifesto.

18. Fossil fuel usage can be split into three sectors: residential, commercial/ industrial and transport, and in the UK these are roughly similar in size. The production of CO₂ in the UK, is declining slightly in the residential and commercial/ industrial sectors, but rising in the transport sector. The reason for this rising trend is attributable to increasing numbers of cars and their usage. In addition modern catalyst cars oxidise exhaust emissions into non-toxic water and carbon dioxide. This will lead to a future increase in greenhouse gas emissions.

19. All local authorities within West Yorkshire are making efforts to progress sustainable development. The essence of the Local Agenda 21 is now embedded into all strategic planning due to the imminent enactment of the Local Government Bill 1999. This Bill requires 'community strategies' to demonstrate how they contribute to local and national sustainability, regarding long term social, economic and environmental well-being.

20. Annual average CO₂ emission maps indicate a similar distribution to that of NO_x emissions (see the Annual Progress Report). Hot spots in emissions border the major motorway network and the centres of Leeds and Bradford, with emission rates/Km² exceeding 10,000 tonnes/year.

21. CO₂ is a non-toxic gas and therefore has little significance regarding local air quality. However, CO₂ contributes towards around 65% to 70% of the potential global warming effect of the atmosphere. The annual CO₂ emission rate over the West Yorkshire region based on average weekday traffic flows is massive, estimated at 2.88 x 10⁶ tonnes/year.

22. The region's air quality strategy supports the government's overall aims of improving air quality. The combined impact of the LTP measures should lead to an overall reduction in urban air pollution in future years.

23. The LTP strategy includes measures to provide high quality alternatives to the car and lorry and to manage travel demand, with a target of reducing and then eliminating traffic growth. It is intended that these actions will fulfil the LTP air quality objective.

NOISE

LTP Objective: "To improve environmental quality and reduce the impacts of transport pollution on air quality and noise"

23. Noise is described as "unwanted sound" by the receiver. Transportation noise (road, rail and air) currently affects around 60% of the population in the UK. Road traffic noise is the most extensive source of noise pollution. The level of disturbance generated by road traffic depends on the actual noise level, its variability and the time of occurrence.

24. The best noise index for describing road traffic noise disturbance is the L10 (18 hour) dB(A). This index represents the arithmetic mean of hourly noise levels which are exceeded for 10% of the time, over an 18 hour period between 06:00 - 24:00hrs. The noise level is measured as an 'A' weighted decibel. Traffic noise levels approaching an L10 (18 hour) 68 dB(A) are likely to cause some degree of disturbance for 50% of the occupants inside a dwelling.

25. A variety of factors can influence changes in road traffic noise, these include: distance from road, type and numbers of vehicles, road surface, gradient, vehicle speed and weather conditions. The magnitude of disturbance will depend on the L10 (18 hour) dB(A) noise exposure and the sensitivity of frontage property and land-use.

Mitigating Measures.

26. The LTP strategy includes measures to provide high quality alternatives to the car and lorry and to manage travel demand, with a target of reducing and then eliminating traffic growth. It is intended that these actions will help to fulfil the LTP noise pollution objective, in association with more specific actions proposed below.

27. The Town & Country Planning (Environmental Impact Assessment)(England & Wales) Regulations 1999 ensure environmental impact assessments (EIAs) are conducted for major transportation schemes. The EIA process will aid scheme design by realignment of the carriageway away from sensitive locations, or by design of purpose built earth mounds and roadside noise barriers.

28. The EIA process, combined with the Noise Insulation (Amendments) Regulations 1988, will highlight all necessary noise insulation works, prior to construction and use of new or altered highways. The use of a low noise surfacing is becoming more prevalent, when new, or existing carriageways are shown to affect high density residential or other sensitive frontage.

29. Prospective EU legislation concerning the Future Noise Policy is likely to be proposed sometime between 2002/3. Part of this legislation will refer to "Noise Mapping" of urban areas. The intention of noise mapping is to highlight sensitive urban/suburban areas that are affected by high ambient noise levels, and help develop suitable mitigation procedures. Most of these action plans will relate to transportation, especially road traffic.

30. It is likely that the proposed legislation will require conurbation's, with a population greater than 250,000, to be noise mapped within 18 months of enforcement. It is intended that future annual progress reports will anticipate the future demands of noise mapping, and include appropriate proposals to help reduce road traffic noise and relevant locations.