

Local Air Quality Management Case Study – Managing Transport Emissions

The Situation: Leicester is a medium-sized city with a typically busy commercial centre served by major radial roads. The City has experienced significant growth in road traffic in recent decades and for much of that time the Council has responded by developing infrastructure to manage traffic (as well as more traditional road schemes to re-route traffic). The City Council has monitored exceedences of the NO₂ annual mean air quality objective every since 2000. They declared an AQMA in the same year and later enlarged this in 2008. Local traffic on major roads has been estimated to contribute up to 90% of NOx at receptors in the AQMA and identified road transport as the dominant local source of emissions. This is a typical situation in many urban AQMAs.

The Response: The key features of the response to the challenge include:

Installing and integrating traffic management infrastructure

Since 1972 Leicester has invested in a range of traffic management systems. At this stage they have been integrated into a powerful system for dynamically managing traffic across the city. The system is used to manage traffic for the city, the remainder of Leicestershire County and Rutland County. Key elements in the system include:

- Networks of volumetric and classified traffic counters, CCTV cameras and automated number plate recognition cameras for providing near real time and historic data on traffic levels and emerging congestion incidents.
- SCOOT – Dynamic traffic signal management system
- SIESPACE – A car park guidance system with 25 inter-active signs distributed on routes into and within the city centre providing real time information on the occupancy details of car parks in the city centre
- STAR-TRAK – Real time bus service information system covering approximately 500 vehicles and 400 signed stops
- COMET – a common database integrating all these sub-systems and displays information relevant to managing the network in map and other formats
- An extensive array of providing traffic information to the public:
 - <http://leicestertravel.info/> A website dedicated to up to date roadworks, car park, bus and rail timetable and road cctv information
 - <http://www.star-trak.co.uk/> A website dedicated to up to date bus service information (supplemented with a mobile phone text system)
 - Regular broadcasts to BBC local radio from the Area Traffic Control room
 - Car park occupancy sign system and variable message sign system to inform drivers of diversions

Use of the system

The data the system generates is a powerful resource from which a range of traffic management strategies has been developed. Traffic can be managed in real-time as incidents arise or during periods where roadworks are disrupting normal flow. Over time a number of regularly occurring ‘cases’ have been identified (e.g. local football team hosting a home match) and the system can be set to optimise traffic flow during these cases (i.e. as opposed to ‘normal’ situations). The use of COMET to integrate separate systems means action can be coordinated to deal with differing conditions.

Analysis to refine management strategy

A key principle in using the system has been to analyse historical data to refine management strategies to ensure they remain optimised for current day conditions and flow rates. The system also incorporates real-time kerbside monitoring data (NO_2 and PM) and dispersion model capability (Air-Viro). These are being used in a number of UK and European-wide research examining health and air quality impacts associated with urban traffic. The system also indicates clearly the dominant role of congestion in traffic emissions and hence strongly indicates the benefits of managing traffic to minimise congestion.

The Benefits: Leicester admits that despite these systems the annual mean objective for NO_2 will not be achieved throughout their AQMA soon. However, the system can be considered to have success now and in the future on local air quality management for the following reasons.

- By managing congestion and traffic flow then the current day air quality situation is likely to be much better than if the traffic were not managed
- By focussing on a congestion management strategy the system produces emissions co-benefits by simultaneously reducing emissions of NO_x , PM, CO_2 and other pollutants
- The integration of the traffic management system with a monitoring and modelling system and ongoing research associated with these may produce data that allow Leicester traffic to be optimised against LAQM criteria a) during high concentration episodes and b) longer-term.

Quite apart from air quality considerations, congestion is one of the most costly economic impacts from traffic in urban areas hence investment to manage congestion for economic reasons is often compelling, with the potential air quality benefits listed above being an additional bonus.

Contact for further information

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