

Appendix O: Air Quality Overview

Introduction

The Environment Act 1995 placed a duty on all local authorities to regularly review and assess air quality in their areas and to determine whether or not national air quality objectives are likely to be achieved. The County Council continues to work in partnership with all of Staffordshire's local authorities through a group known as the Staffordshire Air Quality Forum (SAQF), which aims to reduce the occurrences of poor air quality whilst also helping authorities implement cost-effective solutions.

Since April 2006, eight locations within Staffordshire have been declared due to the maximum recommended levels of nitrogen dioxide (NO₂) caused by road traffic emissions being exceeded. A map showing these locations can be found on page 67 of the main Strategy Plan and at the end of this appendix. A summary of progress so far can be found below.

Cannock Chase AQMA

In July 2006, Cannock Chase Council declared an AQMA along the A5 Watling Street, between the Churchbridge and Longford islands and the district boundary at Wedges Mills, which included 56 residential properties. The A5 is classed as a Trunk Road and is therefore the responsibility of the Highways Agency. The A4601 at Wedges Mills is the responsibility of the County Council. Working with all parties, Cannock Chase Council is leading the production of an action plan which will be out for consultation in the spring of 2011.

In November 2009, Cannock Chase Council submitted an Updating and Screening Assessment to the Department for Environment, Food and Rural Affairs (Defra), which identified a single domestic property along the A5, east of Churchbridge that required a detailed assessment on the basis of potential exceedance of nitrogen dioxide levels caused by road traffic. A detailed assessment report published in July 2010 recommended that monitoring continue to establish more robust data and a further update be given in the next Updating and Screening Assessment due in April 2012. If more up to date monitoring data confirms an exceedance, Cannock Chase Council may be required to produce a Detail Assessment before April

2012. The council will also publish an annual progress report in the spring of 2011.

East Staffordshire AQMA

In February 2007, East Staffordshire Borough Council declared two AQMAs within Burton upon Trent, comprising 773 residential properties. All of the roads within the AQMAs are the responsibility of the County Council. The largest AQMA included Derby Road, Derby Street, part of Princess Way roundabout, Horninglow Street, Horninglow Road, Bridge Street, Wellington Street, part of Borough Road, part of Wellington Street roundabout, part of Waterloo St and part of Byrkley St. The second AQMA was located around St Peters Bridge roundabout and a part of St Peters Street in Stapenhill.

An action plan was submitted to Defra in August 2009 and actions included measures to encourage council staff to travel less, council fleets to become greener and drivers to undertake eco-driving training. Other measures include studies into the potential for a park and ride and a review of cycle parking within the town. A copy of the action plan can be downloaded from www.eaststaffsbc.gov.uk. East Staffordshire Borough Council submitted its annual progress report to Defra in December 2010.

Lichfield AQMA

In August 2008, Lichfield District Council declared an AQMA covering the A5 Muckley Corner traffic island comprising seven residential properties, a garage and a hotel. The A5 is classed as a Trunk Road and is therefore the responsibility of the Highways Agency whilst the other access roads off the island (namely the A461) are the responsibility of the County Council. Working with both parties, Lichfield District Council produced an action plan, which was submitted to Defra in November 2010.

In May 2009, Lichfield District Council submitted an Updating and Screening Assessment to Defra, which confirmed exceedances within the existing AQMA at Muckley Corner, along with the A38 at Canwell and Alrewas. The Council proposed to undertake additional monitoring and a Detailed Assessment of NO₂ of the

A38 at Canwell to determine whether there were any exceedences of the annual NO₂ objective. This Detailed Assessment noted that the dispersion modelling that was undertaken predicted that there would be no breaches of NO₂ in 2010. Lichfield District Council therefore propose to confirm there is no need to declare a further AQMA once the monitoring results for 2010 have been ratified and intend to confirm this in their next Progress Report due in spring 2011.

South Staffordshire AQMA

In February 2006, South Staffordshire Council declared four AQMAs and a fifth AQMA in March 2008. The first AQMA, known as 'Woodbank' included a single dwelling adjacent to the M6 Motorway between junctions 12 and 13; the second known as 'Bursnips', included three properties that sat alongside the A462 bridge which straddled the M6 at its junction with the M54 (junction 10A). The third AQMA, known as 'Featherstone' was

revoked in April 2007 due to the levels of NO₂ being significantly lower than predicted. The fourth, known as 'Wedges Mills', ran alongside the A4601 Wolverhampton Road which joins the Cannock Chase AQMA boundary. The fifth AQMA, known as 'Oak Farm', is situated between junction 12 of the M6 and Cannock along the A5. In total, 22 residential properties are included within the four remaining AQMAs, comprising one at 'Woodbank', three at 'Bursnips', 17 at 'Wedges Mills' and one at 'Oak Farm'.

An action plan is currently being prepared and South Staffordshire Council is also producing an annual progress report which will be published in the spring of 2011.

Table O1 below provides some information on the current health impacts associated with common chemical emissions associated with transport including those which are a particular problem locally.

Table O1 Details of Typical Road Transport related Pollutants and Health/Environment Impacts

| Pollutant | Description and main UK sources | Potential effects on health/environment |
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| Particulate Matter (PM-PM ₁₀ and PM _{2.5}) | Particulate Matter is generally categorised on the basis of the size of the particles (for example PM _{2.5} is particles with a diameter of less than 2.5µm). PM is made up of a wide range of materials and arise from a variety of sources. Concentrations of PM comprise primary particles emitted directly into the atmosphere from combustion sources and secondary particles formed by chemical reactions in the air. PM derives from both human-made and natural sources (such as sea spray and Saharan dust). In the UK the biggest human-made sources are stationary fuel combustion and transport. Road transport gives rise to primary particles from engine emissions, tyre and brake wear and other non-exhaust emissions. Other primary sources include quarrying, construction and non-road mobile sources. Secondary PM is formed from emissions of ammonia, sulphur dioxide and oxides of nitrogen as well as from emissions of organic compounds from both combustion sources and vegetation. | Both short-term and long-term exposure to ambient levels of PM are consistently associated with respiratory and cardiovascular illness and mortality as well as other ill-health effects. The associations are believed to be causal. It is not currently possible to discern a threshold concentration below which there are no effects on the whole population's health. PM ₁₀ roughly equates to the mass of particles less than 10 micrometres in diameter that are likely to be inhaled into the thoracic region of the respiratory tract. Recent reviews by WHO and Committee on the Medical Effects of Air Pollutants (COMEAP) have suggested exposure to a finer fraction of particles (PM _{2.5} , which typically make up around two thirds of PM ₁₀ emissions and concentrations) give a stronger association with the observed ill health effects, but also warn that there is evidence that the coarse fraction between (PM ₁₀ – PM _{2.5}) also has some effects on health. |
| Oxides of nitrogen (NO _x) | All combustion processes in air produce oxides of nitrogen (NO _x). Nitrogen dioxide (NO ₂) and nitric oxide (NO) are both oxides of nitrogen and together are referred to as NO _x . Road transport is the main source, followed by the electricity supply industry and other industrial and commercial sectors. | NO ₂ is associated with adverse effects on human health. At high levels NO ₂ causes inflammation of the airways. Long term exposure may affect lung function and respiratory symptoms. NO ₂ also enhances the response to allergens in sensitive individuals. High levels of NO _x can have an adverse effect on vegetation, including leaf or needle damage and reduced growth. Deposition of pollutants derived from NO _x emissions contribute to acidification and/or eutrophication of sensitive habitats leading to loss of biodiversity, often at locations far removed from the original emissions. NO _x also contributes to the formation of secondary particles and ground level ozone, both of which are associated with ill-health effects. Ozone also damages vegetation. |

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| Ozone (O ₃) | Ozone is not emitted directly from any human-made source. It arises from chemical reactions between various air pollutants, primarily NO _x and Volatile Organic Compounds (VOCs), initiated by strong sunlight. Formation can take place over several hours or days and may have arisen from emissions many hundreds, or even thousands of kilometres away. | Exposure to high concentrations may cause irritation to eyes and nose. Very high levels can damage airways leading to inflammatory reactions. Ozone reduces lung function and increases incidence of respiratory symptoms, respiratory hospital admissions and mortality. Ground level ozone can also cause damage to many plant species leading to loss of yield and quality of crops, damage to forests and impacts on biodiversity. |
| Sulphur dioxide (SO ₂) | UK emissions are dominated by combustion of fuels containing sulphur, such as coal and heavy oils by power stations and refineries. In some parts of the UK, notably Northern Ireland, coal for domestic use is a significant source. | Causes constriction of the airways of the lung. This effect is particularly likely to occur in people suffering from asthma and chronic lung disease. Precursor to secondary PM and therefore contributes to the ill-health effects caused by PM ₁₀ and PM _{2.5} . Potential damage to ecosystems at high levels, including degradation of chlorophyll, reduced photosynthesis, raised respiration rates and changes in protein metabolism. Deposition of pollution derived from SO ₂ emissions contribute to acidification of soils and waters and subsequent loss of biodiversity, often at locations far removed from the original emissions. |
| Polycyclic aromatic hydrocarbons (PAHs) | There are many different PAHs emanating from a variety of sources. This strategy uses benzo[a]pyrene (B[a]P) as a marker for the most hazardous PAHs. The main sources of B[a]P in the UK are domestic coal and wood burning, fires (eg accidental fires, bonfires, forest fires, etc), and industrial processes such as coke production. Road transport is the largest source for total PAHs, but this source is dominated by species thought to be less hazardous than B[a]P. | Studies of occupational exposure to PAHs have shown an increased incidence of tumours of the lung, skin and possibly bladder and other sites. Lung cancer is most obviously linked to exposure to PAHs through inhaled air. Individual PAHs vary in their ability to induce tumours in animals or humans. The carcinogenic potency of some PAHs is unknown or uncertain. Individual PAHs have been classified by the International Agency for Research on Cancer, with three classified as "probably carcinogenic to humans", including B[a]P, and three classified as "possibly carcinogenic to humans". |
| Benzene | Has a variety of sources, but primarily arises from domestic and industrial combustion and road transport. | Benzene is a recognised human carcinogen which attacks the genetic material and, as such, no absolutely safe level can be specified in ambient air. Studies in workers exposed to high levels have shown an excessive risk of leukaemia. |
| 1,3-butadiene | Mainly from combustion of petrol. Motor vehicles and other machinery are the dominant sources, but it is also emitted from some processes, such as production of synthetic rubber for tyres. | 1,3-butadiene is also a recognised genotoxic human carcinogen, as such, no absolutely safe level can be specified in ambient air. The health effect of most concern is the induction of cancer of the lymphoid system and blood-forming tissues, lymphoma and leukaemia. |
| Carbon monoxide (CO) | Formed from incomplete combustion of carbon containing fuels. The largest source is road transport, with residential and industrial combustion making significant contributions. | Substantially reduces capacity of the blood to carry oxygen to the body's tissues and blocks important biochemical reactions in cells. People with existing diseases which affect delivery of oxygen to the heart or brain, such as angina, are at particular risk. |
| Lead (Pb) | Emitted from the combustion of coal and also the iron and steel combustion and nonferrous metals. | Exposure to high levels in air may result in toxic biochemical effects which have adverse effects on the kidneys, gastrointestinal tract, the joints and reproductive systems, and acute or chronic damage to the nervous system. Affects intellectual development in young children. |
| Ammonia | Mainly derived from agriculture, primarily livestock manure/slurry management and fertilisers. Small proportion derived from variety of sources including transport and waste disposal. | Ammonia can lead to damage of terrestrial and aquatic ecosystems through deposition of eutrophying pollutants and through acidifying pollutants. Precursor to secondary PM and therefore contributes to the ill-health effects caused by PM ₁₀ and PM _{2.5} . |

Map 1 : Current Air Quality Management Areas

