



Pollution Control

**Built Environment –
Engineering & Transportation Services**

Health Scrutiny Panel 15th March 2010

Air Quality – M6 Motorway Corridor

Briefing note prepared by:

John Grant - Scientific Manager
Pollution Control
Engineering & Transportation Services

Address for correspondence

Walsall Metropolitan Borough Council
2nd Floor Civic Centre
Darwall Street
Walsall WS1 1DG

Telephone: 01922 652277
email: pollutioncontrol@walsall.gov.uk
Fax: 01922 623234

February 2010

Contents

		Page No.
1.0	Informative - Overview of Air Quality Review and Assessment	2
2.0	Local Issues in Walsall	3
3.0	Air Quality Review and Assessment in Walsall	4
4.0	Air Quality Management Areas – Nitrogen Dioxide	4
5.0	Air Quality Monitoring in Walsall	6
6.0	Current Air Quality Work	8
7.0	Summary	10
Addendum		
	Nitrogen Dioxide and Oxides of Nitrogen	11
Figures		
Figure 1:	Predicted Annual NO ₂ Contours - Walsall 2005	5
Figure 2:	Automatic Air Quality Monitoring – M6 Corridor	7
Figure 3:	Location of Walsall Automatic Monitoring Sites	7
Figure 4:	2009 Modelled Nitrogen Dioxide Contours (preliminary)	8
Figure 5:	M6 Corridor Predicted Annual Mean NO ₂ Concentrations	9

1.0 Informative - Overview of Air Quality Review and Assessment

1.1 The Environment Act 1995 Part IV (as amended) introduced a new regime in the United Kingdom requiring local authorities to review air quality in their areas on an annual basis as part of a three year cycle of reporting to central government. This is to ensure that air quality objectives (AQOs) are met relating to seven (of eight in total) key air pollutants that are set out in The Air Quality Strategy for England, Scotland, Wales and Northern Ireland ('the Strategy').

1.2 AQOs specified in the Strategy are fundamentally designed to protect human health and are assessed in areas of relevant exposure, namely where people are regularly exposed to, and may be affected by, air pollution. The pollutants for which objectives have been set and local authorities are obliged to assess are as follows:

- ▶ 1,3 Butadiene
- ▶ Benzene
- ▶ Carbon monoxide (CO)
- ▶ Lead (Pb)
- ▶ Nitrogen Dioxide (NO₂)
- ▶ Particles (as PM₁₀)
- ▶ Sulphur Dioxide (SO₂)

1.3 A further objective relating to ozone (O₃) is also included, although this is a long-range trans-boundary pollutant, and is seen as a national, rather than a local problem, that is to be dealt with by central government.

1.4 As part of the three year cycle of air quality reporting local authorities must produce an Updating and Screening Assessment (USA) for their area. If the USA identifies places where air quality objectives are not likely to be met by a target date, it is then necessary for a Detailed Assessment to be undertaken for the given pollutant(s) and, as required, for an Air Quality Management Area (AQMA) to be declared.

1.5 Thereafter, a Further Assessment within 12 months of an AQMA declaration is required, and an Air Quality Action Plan (AQAP) has to be produced setting out how

the local authority will work towards meeting AQOs.

1.6 Local authorities also have to produce air quality Progress Reports in conjunction with Detailed Assessments as identified in the preceding year's USA. A Progress Report is currently being prepared by Pollution Control (Engineering and Transportation Services)

1.7 The council's 2009 USA report has been accepted by Department for Environment, Food and Rural Affairs (Defra), and together with other air quality reports and information is available at

http://www.walsall.gov.uk/index/environment/pollution/air_quality.htm

2.0 Local Issues in Walsall

2.1 Walsall MBC is a relatively large urban local authority, with a population of c.253,000 spread over an area of approximately 10,250 hectares (equivalent to about 40 square miles). It has a relatively high population density of c. 24.4 persons per hectare, which is not evenly distributed, and consequently features high density populations in and around urban centres.

2.2 The borough town of Walsall is located centrally in the UK and is surrounded by six other local authorities, namely Lichfield District Council to the north; Birmingham City Council to the east and south east; Sandwell Metropolitan Borough Council to the south; Wolverhampton City Council to the west; and South Staffordshire Council and Cannock Chase District Council to the north west.

2.3 Walsall town centre is surrounded by a ring road incorporating five major radial roads. In addition, the heavily trafficked M6 motorway located to the west of the town centre runs north west to south east through the Borough.

2.4 Walsall also has 22 industrial emission sources which are classed as 'significant', 13 of which are classified as A1 installations regulated by the Environment Agency, and 9 of which are A2 installations regulated by the council under the Environmental

Permitting (England and Wales Regulations) 2007 (as amended).

3.0 Air Quality Review and Assessment in Walsall

3.1 In April 1999 Walsall Council published its First Stage review and assessment of air quality involving the identification of significant sources of air pollution within and surrounding the borough, reviewing the levels of air pollutants for which prescribed standards and objectives have been set, and estimating the likely future levels.

3.2 The First Stage confirmed that the air quality objectives for 1,3 butadiene, benzene and CO would be achieved by the required deadlines, and that a second and third stage review and assessment would be required in relation to lead, NO₂, SO₂ and PM₁₀ to identify existing or likely exceedances of air quality objectives by deadlines specified in the Air Quality Strategy. This detailed investigation was intended to determine whether or not the council would need to declare AQMAs. The investigation utilised data obtained from computer modelling techniques, emission inventories, road traffic surveys and results obtained from a network of air pollution monitoring stations located throughout Walsall and the West Midlands.

3.3 A combined Second and Third Stage Review & Assessment required the council to provide further screening of pollutant concentrations with reference to AQOs and their associated compliance deadlines, together with accurate detailed assessments of current and future air quality. This combined Assessment concluded that in Walsall the Government's air quality objectives would be met by the specified deadlines and that no air quality management areas would need to be declared. The report nonetheless recognised that further work would be required before the next review and assessment that was due in 2003 to overcome anomalies identified in relation to measured and modelled concentrations of certain pollutants, notably NO₂.

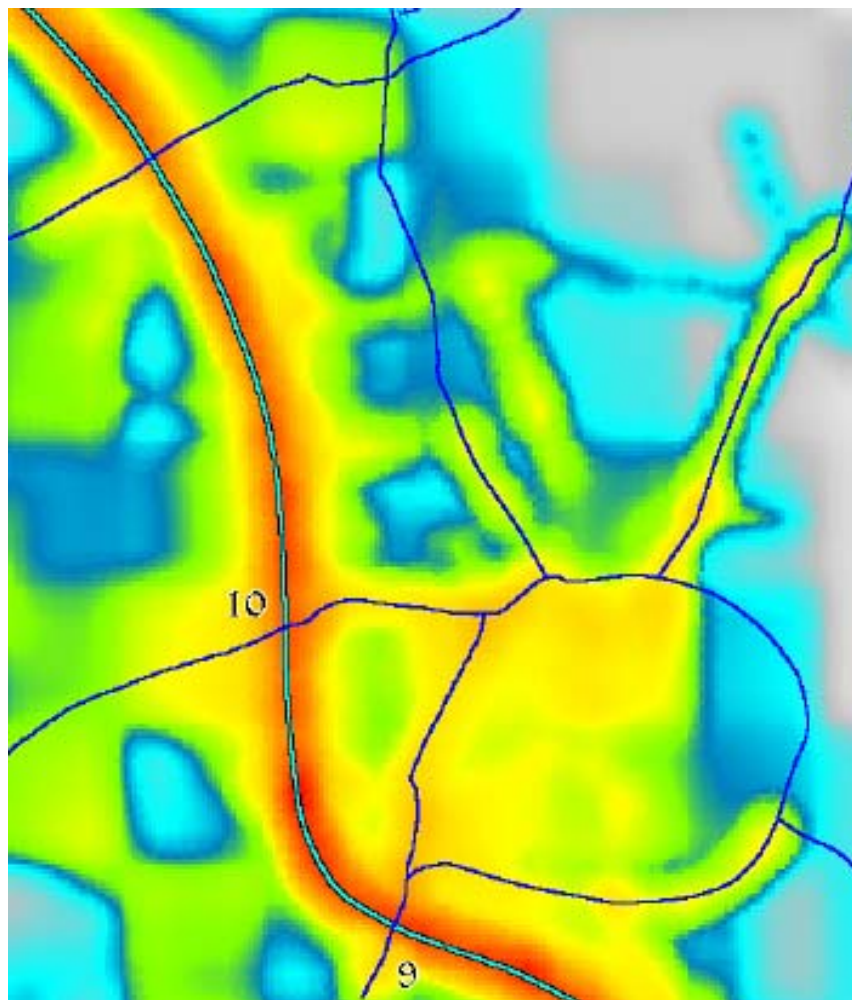
4.0 Air Quality Management Areas – Nitrogen Dioxide

4.1 An addendum report was subsequently produced specifically in regard to NO₂ which led to the declaration of five AQMAs in 2002. Primarily these were in the region of the M6 motorway.

4.2 As part of continuing work on air quality it was established that the council's original five AQMAs did not sufficiently reflect all locations where AQOs are (or were) likely to be exceeded, and hence it was therefore necessary to redefine the AQMAs.

4.3 A strategic review was carried out to inform this process, which clearly identified the M6 corridor and the A454 and A 461/A4148 (from M6 Junctions 10 and 9 respectively) as main traffic routes giving rise to poor air quality (red to yellow in Figure 1).

Figure 1: Predicted Annual NO₂ Contours - Walsall 2005



4.4 In August 2006 Walsall MBC subsequently revoked the five original AQMAs in order to consolidate the whole of its borough as an AQMA. The Walsall Air Quality Management Area 2006 for NO₂ was declared on 31st August 2006.

5.0 Air Quality Monitoring in Walsall

5.1 Within the Borough are a number of dedicated air quality monitoring stations which are operated and maintained by Pollution Control (Engineering and Transportation Services). In particular, Pollution Control's laboratory provides a specialist service in this respect for the purpose of delivering the council's statutory air quality review and assessment duties.

5.2 Historically the council has undertaken air quality monitoring since the 1960s, and nowadays this is focussed on the requirements of The Air Quality Strategy for England, Scotland, Wales and Northern Ireland and specifically NO₂ and PM₁₀. Location of current automatic monitoring sites are depicted in Figure 3.

Note: Additional non-automatic air quality monitoring is also carried out on an identified need basis.

5.3 The council has operated automatic air quality monitoring stations located either side of the M6 corridor at Alumwell (1987 onwards), Bescot (2004 onwards), and Short Heath (1997 onwards), some of which have formed part of a national (i.e. government) network of sites for air quality reporting. These have been specifically tailored to NO₂ arising primarily from road traffic.

5.4 The council has carried out a number of discrete monitoring exercises using NO₂ diffusion tubes (non-automatic monitoring) along major roadways and near to the M6 itself, including A454 Wolverhampton Road and A461 Bescot Road. Data from this has been used in the council's reports to Defra, and most recently to verify updated predictive modelling of air pollution (Figure 4).

5.4 The overall trend for levels of NO₂ at Alumwell has decreased, and currently meets air quality objectives. This is also apparent at Short Heath, Willenhall.

5.5 From 2003 to 2005 levels of NO₂ at Alumwell exceeded the annual AQO, and for 2008 levels were at the objective value.

Figure 2: Automatic Air Quality Monitoring – M6 Corridor

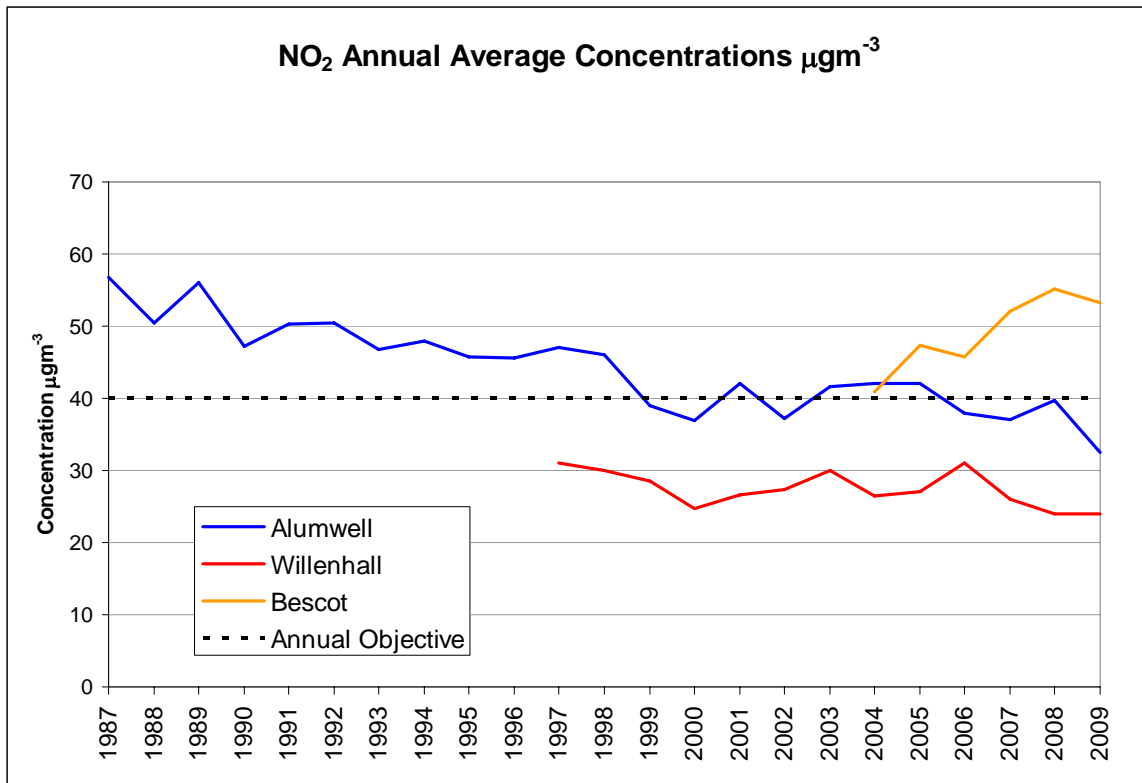


Figure 3: Location of Walsall Automatic Monitoring Sites



5.6 Since monitoring commenced at Bescot, NO₂ levels have consistently exceeded the annual AQO and remain so.

Note : AQOs are policy targets, often expressed as maximum ambient concentrations of pollutants not to be exceeded, either without exception, or with a permitted number of exceedances within a specified timescale. These 'standards' are based on assessment of the effects of a pollutant on human health, including the effects on sensitive subgroups such as the young, elderly and infirm.

6.0 Current Air Quality Work

6.1 Following declaration of the whole-borough AQMA, the council was required to produce an Air Quality Action Plan (AQAP). This has been finalised and is available at: http://www.walsall.gov.uk/air_quality_action_plan_2009.pdf The council's AQAP is presently under review.

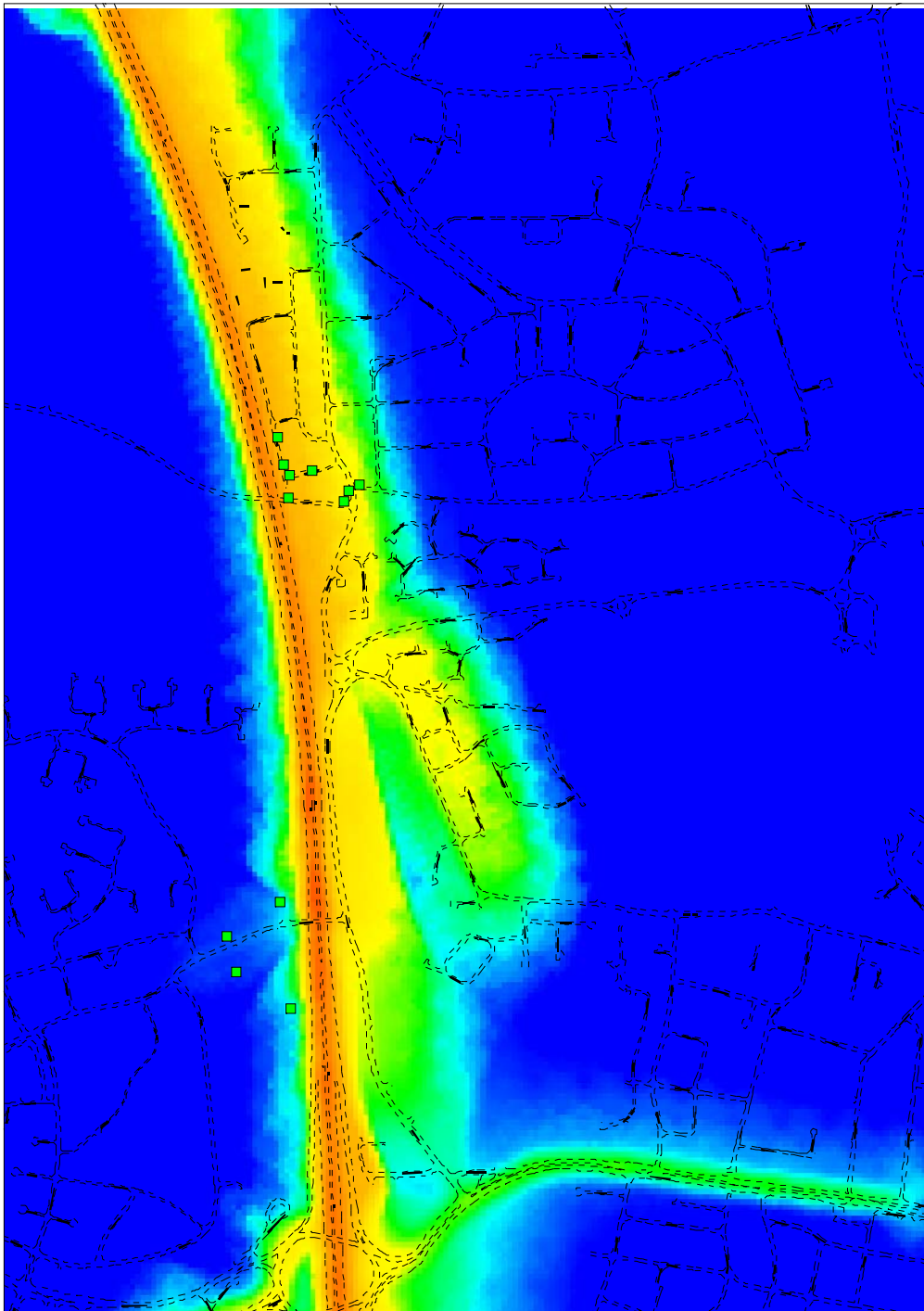
6.2 Additionally, the council must prepare a Further Assessment report relating to the whole-borough declaration. This work is in preparation, and has involved re-modelling traffic pollution (as NO₂) for the whole borough. Already this has demonstrated poor air quality along the M6 corridor and exceedances of the AQO at relevant receptors such as (residential premises) shown as red in Figure 4.

Figure 4: 2009 Modelled Nitrogen Dioxide Contours (preliminary)



6.3 On behalf of Regeneration Services, in January 2010 Pollution Control carried out a specific study of the M6 around Bentley to provide an up to date indication of air quality in regard to nitrogen dioxide. Areas depicted in red into yellow in Figure 5 indicate where the annual air quality objective for NO₂ is predicted to be exceeded.

Figure 5: M6 Corridor Predicted Annual Mean NO₂ Concentrations



7.0 Summary

7.1 Air quality in the vicinity of the M6 is predicted as generally poor compared to the remainder of the borough, and there have been exceedances of an AQO at relevant receptors. This is also the case along major arterial roads intersecting junctions 9 and 10.

7.2 Assessments over the course of 2009 and the early part of 2010 indicated that air quality in these regions will remain poor. On-going air quality monitoring will continue to inform the council as to how the situation is changing.

7.3 The council's borough AQAP identifies a need to improve air quality due to road traffic. In the case of the M6 however, it should be noted that the council has no direct jurisdiction over highway matters.

7.4 The Highways Agency, on behalf of the Department of Transport, is currently implementing a scheme of Active Traffic Management along the M6 which is designed to ease congestion. Additional benefits are anticipated by the Highways Agency including improvements in air quality based on experience of such schemes along the M42.

7.5 The situation as outlined is not unique to Walsall. Throughout the UK there are many Air Quality Management Areas that have been declared on account of road traffic pollution. Within the West Midlands, the councils of Birmingham, Dudley, Sandwell and Wolverhampton have similarly declared their whole boroughs as Air Quality Management Areas due to levels of NO₂ stemming from road traffic. The Highways Agency are understood to be considering the introduction of mandatory speed limits among other options on sections of the M1 motorway during high pollution episodes. This is related to capacity improvements on the motorway and designated AQMAs where air quality is poor.

Addendum

Nitrogen Dioxide and Oxides of Nitrogen

A.1 Nitrogen dioxide (NO₂) and nitric oxide (NO) are both oxides of nitrogen collectively referred to as NO_x.

A.2 High temperature combustion processes produce emissions of NO_x, notably in the form of NO. This can then be converted to NO₂ through chemical reactions in the atmosphere, including reaction with ozone. Nationally the primary sources of oxides of nitrogen are the transport sector and large scale combustion processes.

A.3 Nitrogen dioxide is associated with adverse effects on human health. It is a respiratory irritant and is linked with increased susceptibility to respiratory infection.

Further information on air quality in Walsall is available at:

http://www.walsall.gov.uk/index/environment/pollution/air_quality.htm