

Shropshire
Council

LAQM DETAILED ASSESSMENT FOR Oswestry AQMA (Nitrogen Dioxide)

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Executive Summary

In 2004 Oswestry Borough Council declared an Air Quality Management Area covering the area known as Gate House, at the junction on the A438, Sweeny, Oswestry, SY10 8AA using powers under the Environment Act 1995 section 83(2)(b) 2003. The Air Quality Management Area was declared due to a likely breach of the annual mean nitrogen dioxide national air quality objective of 40 µg/m³.

Oswestry Borough Council became part of Shropshire Council when Oswestry Borough Council, Bridgnorth District Council, Shrewsbury and Atcham Borough Council, South Shropshire District Council, North Shropshire District Council and Shropshire County Council formed the unitary authority called Shropshire Council.

The report below provides monitoring data from a triplicate of diffusion tubes at a location representative of the AQMA. Monitoring demonstrates no likely breach of the annual nitrogen dioxide objective level in any year since 2005. The trend shows a reduction in pollutant over time and there is no information to suggest that this will change having considered proposed developments in the area.

It is concluded that it is not likely that the annual mean NO₂ concentration will exceed the national air quality objective in this location.

It is proposed that the Oswestry AQMA (nitrogen dioxide) is revoked by Order under section 83(2)(b) of the Environment Act 1995.

1. Introduction

1.1 Project Background

In 2004 Oswestry Borough Council declared an Air Quality Management Area covering the area known as Gate House, at the junction on the A438, Sweeny, Oswestry, SY10 8AA using powers under the Environment Act 1995 section 83(2)(b) 2003. The Air Quality Management Area was declared due to a likely breach of the annual mean nitrogen dioxide national air quality objective of 40 µg/m³.

Shropshire Council is a Unitary Authority and as such has a duty to comply with air quality legislation and the Local Air Quality Management regime. An Updating and Screening Assessment was carried out as part of the fifth round of reporting covering data from 2009-2014 inclusively. Monitoring results from a location considered representative of the Oswestry AQMA (nitrogen dioxide) were reviewed. The results indicated no likely breach of the national air quality objective level. As a result a detailed assessment taking into consideration all of the past monitoring undertaken was proposed.

1.2 Legislative Background

The latest Air Quality Strategy (AQS) released in July 2007 provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the Government to protect human health. The objectives for ten pollutants (benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide particulates - PM10 and PM2.5- and ozone) have been prescribed within the Air Quality Strategy based on The Air Quality Standards (England) Regulations 2007. The Objectives set out in the AQS for the protection of human health are presented in Table 1.1.

The Air Quality Standards (England) Regulations 2007 came into force on 15th February 2007 and brings together the Government's requirements to fulfil each EU Daughter Directive through a single statutory instrument.

The Environment Act 1995 gives local authorities duties and responsibilities to review and assess air quality in its area and secure improvements in air quality where required. The locations where the AQS objectives apply are defined in the AQS as locations outside buildings or other natural or manufactured structures above or below ground where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period of the AQS objective.

1.3 Air Quality Strategy Objectives

This study is interested in the annual mean nitrogen dioxide concentration as this is the objective that was thought would be likely to be breached and hence an AQMA declared. This level is $40 \mu\text{g}/\text{m}^3$.

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928) and The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table 1: Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	$16.25 \mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	$5.00 \mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	$2.25 \mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	$10.0 \text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	$0.5 \mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	$0.25 \mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	$200 \mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	$40 \mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM₁₀) (gravimetric)	$50 \mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	$40 \mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	$350 \mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	$125 \mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	$266 \mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Scope and Methodology of the Detailed Assessment

The Oswestry AQMA (nitrogen dioxide) was declared in 2004/05 as it was thought that the annual mean nitrogen dioxide objective was likely to be breached. This was due to their being a residential receptor presenting relevant exposure within 1m of the kerbside of a busy trunk road, the A483. This road generally takes a large amount of traffic with a significant proportion of HGVs. A location map delimiting the AQMA area can be found in Appendix 1.

Review of monitoring data in the recently completed Updating and Screening assessment in 2015 highlighted the fact that the concentration of nitrogen dioxide has dropped in recent years. As a result it was recommended that a detailed assessment should be undertaken to establish if there is any likelihood of any national objective level being breached.

In order to answer the above question a review of all monitoring data at the location representative of the Oswestry AQMA shall be undertaken.

2. Data Collection

2.1 Monitoring Data

Data has been collected since 2004 through a triplicate of diffusion tubes. The location is approximately 30m to the north of the AQMA at grid reference 328922, 325981. It is the same distance from the kerbside as the residential receptor within the AQMA known as The Gate House and therefore no distance corrections are found to be necessary.

The only difference between the AQMA and the monitoring location is that the AQMA is located closer to a junction of a B road and the A438. The B road is not heavily used and development is very sparsely distributed along it. Another B road, the Maesbury Road, which runs in a northerly direction before joining the A438 approximately 2.2km further north than the junction at Gate House is considered to be the preferential route for any traffic heading north in the area. As a result little traffic is known to turn into or out of the B road adjacent to the AQMA. A recent site visit where an officer was on site for circa 1 hour in the mid-afternoon noted no vehicles turned out of or into the junction.

As a result of the explanations above the monitoring position is considered to be representative of the air quality in the AQMA. Table 2 shows the results for each separate tube and the average for all three. Figure 1 plots the average result on a line graph and plots a line of best fit.

Table 2: annual average nitrogen dioxide concentration monitored at the representative location for the AQMA

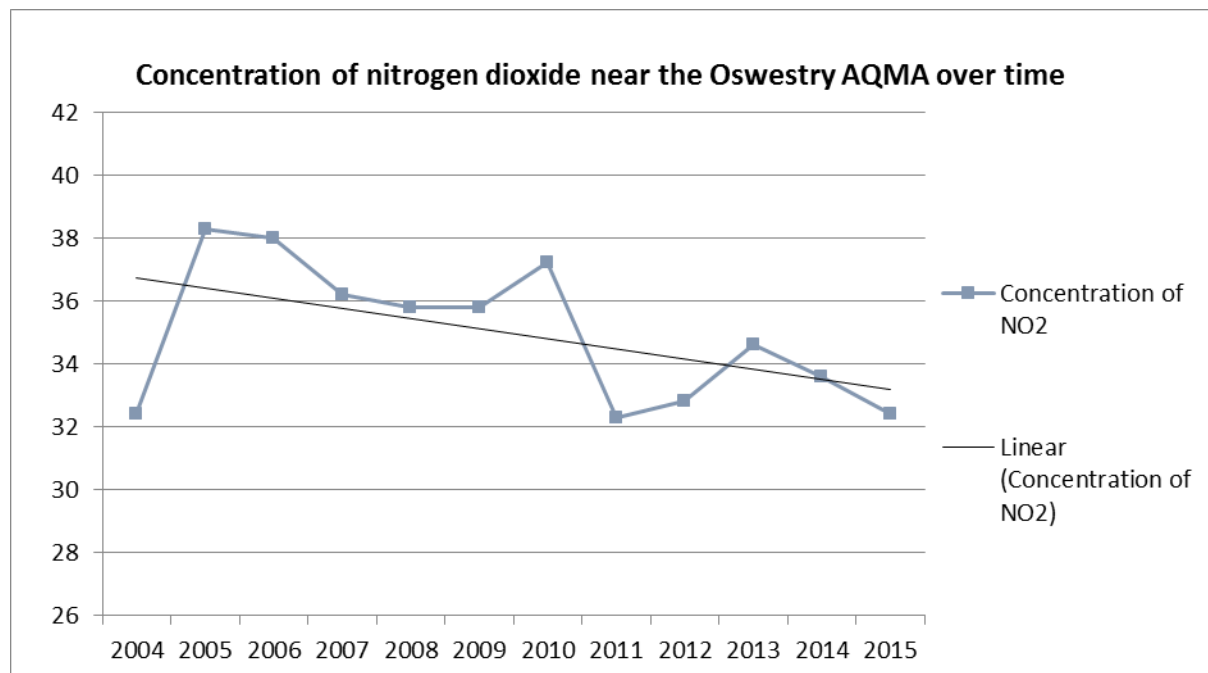
Results stated are in $\mu\text{g}/\text{m}^3$. Data capture is shown in brackets below each result

Tube description	2004 *	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A483 (1)	30.5 (75%)	38.9 (100%)	39.6 (100%)	37.5 (100%)	36.0 (100%)	37.0 (100%)	37.7 (92%)	31.3 (100%)	32.5 (92%)	33.4 (100%)	33.1 (100%)	32.3 (100%)
A483 (2)	34.0 (75%)	36.9 (100%)	36.2 (100%)	34.6 (100%)	34.2 (100%)	33.7 (100%)	36.4 (100%)	32.1 (100%)	33.8 (100%)	33.7 (100%)	33.9 (100%)	32.7 (100%)
A483 (3)	32.8 (75)	39.0 (100%)	38.2 (100%)	36.6 (100%)	37.1 (100%)	35.8 (100%)	37.5 (100%)	33.6 (100%)	32.2 (92%)	36.8 (100%)	33.9 (100%)	32.3 (100%)
Average	32.4	38.3	38.0	36.2	35.8	35.5	37.2	32.3	32.8	34.6	33.6	32.4

*Data collected was for 9 months only (April – December) and therefore likely to under predict actual levels for this year

NB: diffusion tube analysis and quality assurance can be found in Appendix 2.

Figure 1: graph of average diffusion tube nitrogen dioxide concentrations representative of the AQMA.



3. Results and discussion

Averaged monitoring data of a triplicate diffusion tube location highlights a 10% buffer below the national air quality objective in all years since 2008 with the exception of 2010 which is nationally noted as having higher NO₂ levels than are expected in an average year. The trend line on Figure 1 shows a reduction in pollutant levels over time. Latest data shows results to be nearly 20% below the national objective level.

No major development is proposed in the area and therefore it is not expected that transport numbers will change significantly in future years. National data suggests that vehicle numbers will increase incrementally over future years however due to improvements in emission standards for vehicles entering the market these improvements are expected to compensate for increased traffic numbers. An overall decrease in contributions to air pollution through road vehicles is predicted nationally and there is no reason to expect that this trend will not occur in this localised setting.

A general premise behind AQMAs is that they do not blight an area. As this AQMA exists solely around one property this could have a detrimental impact on potential sales of the property should the property be put on the market in future. It is important that where there is no likely exceedance of air quality national objective levels that AQMAs are not left in place. This will ensure that there is no blight on an area/property.

4. Conclusion and Recommendations

- Monitoring undertaken at a representative location of the Oswestry AQMA (nitrogen dioxide) has shown no exceedance of the nitrogen dioxide annual mean national objective level in the past 10 years.
- In 2010, a nationally recognised year of higher than average NO₂ concentrations, monitoring recorded levels of annual mean NO₂ to be 7% below the national objective level.
- In all other years since 2008 recorded nitrogen dioxide annual average has been greater than 10% below the national air quality objective level with the last 2 years greater than 15% below the national objective level.
- The above indicates that concentrations of nitrogen dioxide in the AQMA **have not shown likely exceedance of the National Objective Level** of 40µg/m³ as an annual average in the last ten years.
- Considering future predicted trends in traffic flows, emission outputs from road vehicles and potential development NO₂ **is not likely to exceed the National Objective Level** of 40µg/m³ as an annual average.
- **It is recommended that the Oswestry AQMA (nitrogen dioxide) is revoked** by Order under section 83(2)(b) of the Environment Act 1995.



KEY:
 Area of AQMA represented by hatched area.
 Monitoring location represented by yellow circle.
Appendix 2: diffusion tube analysis data

Diffusion Tube Bias Adjustment Factors

Diffusion tubes were analysed by Gradko International Ltd. within the scope of laboratory quality procedures. The tube preparation method was a 20% TEA/water preparation.

Bias correction was carried out by applying the factors specified in the National Diffusion Tube Bias Adjustment Factor Spreadsheet version number 09/13 for years 2009, 2010, 2011 and 2012 and version number 03/16 for years 2013, 2014 and 2015. NB The use of the latest bias adjustment factors for 2015 has significantly altered the data reported in the 2015 USA as the factor has altered from 0.92 in the USA to 0.87 in the latest version.

The bias adjustment factors used were:

2009: 0.90, 2010: 0.92, 2011: 0.90, 2012: 0.96, 2013: 0.95, 2014: 0.92, 2015: 0.87.

WASP/AIR-PT results

WASP results have been viewed via the DEFRA LAQM webpage links found at:
<http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>

Gradko International were found to have 100% of samples provide satisfactory results when tested by Health and Safety Labs in the time covered by this report on all but two occasions. When tested between April – June 2010 one result out of eight was not satisfactory. In October – December 2011 five of eight samples were not found to be satisfactory. On the whole it is recognised that the vast majority of WASP testing has shown that results obtained have all been satisfactory. As a result it is concluded that the quality control and quality assurance of diffusion tube data collected, after adjustment for bias, is satisfactory. Information obtained from WASP Summary rounds 104 to 124. AIR-PT rounds from April 2013 to present day were checked.