

Contents

<u>Chapter</u>		<u>Page</u>
1.0	Introduction	3
2.0	Monitoring in West Wiltshire	4
3.0	Dispersion modelling methodology	10
4.0	Modelling results	12
5.0	Source Apportionment	14
6.0	Conclusions and recommendations	15
	Abbreviations and glossary	16

Appendices

Appendix 1	Maps showing Air Quality Management Areas
Appendix 2	Response from DEFRA on Stage 3
Appendix 3	Location of Westbury analyser
Appendix 4	Location of new Westbury site
Appendix 5	Location of Bradford On Avon site
Appendix 6	Calibration checklist
Appendix 7	Pre-calibration checklist
Appendix 8	Location maps of diffusion tubes
Appendix 9	Graphs showing diffusion tube results
Appendix 10	Windrose for Yeovilton
Appendix 11	Windrose for Lyneham
Appendix 12	Base case scenarios for Bradford On Avon and Westbury
Appendix 13	Base case scenario for PM ₁₀ and NO ₂ for Bradford on Avon

Executive Summary

This Stage 4 Review and Assessment report summarises the further work undertaken as required under Part IV Environment Act 1995.

The report follows the declaration of two air quality management areas (AQMA) in the district made on 26 November 2001. One order was made in relation to nitrogen dioxide in part of Haynes Road and Warminster Road, Westbury. The other order was made in relation to nitrogen dioxide and PM₁₀ in Masons Lane, Market Street, Silver Street and part of St Margaret's Street, Bradford On Avon.

The purpose of the further assessment is to enable the local authority to supplement information gathered in earlier review and assessment work. It also confirms the original assessment of air quality against the prescribed objectives.

The report is supplementary to the Stage 1, 2 and 3 review and assessment reports.

From the results of the monitoring and modelling carried out as part of the Stage 4 review and assessment it is recommended that a further 3 months of monitoring for PM₁₀ is carried out with a view to removing PM₁₀ from the order in Bradford On Avon, also a further four months of NO₂ monitoring in St Margaret's Street will be carried out with a view to altering the AQMA boundary for NO₂. The AQMA for nitrogen dioxide in Westbury will remain unchanged.

Chapter 1: Introduction

1.1 Duties under the Environment Act 1995

1.1.1 This report forms part of the review and assessment of air quality for West Wiltshire District Council. It forms part of the Local Air Quality Management (LAQM) process required in Part IV of the Environment Act 1995.

1.1.2 As a result of the Stage 3 Review and Assessment, West Wiltshire District Council declared two Air Quality Management Areas (AQMA). One of the orders was made in relation to nitrogen dioxide in part of Haynes Road and Warminster Road, Westbury. The other order was made in relation to nitrogen dioxide and PM₁₀ in Masons Lane, Market Street, Silver Street and part of St Margaret's Street, Bradford On Avon in November 2001. These can be seen in Appendix 1.

1.1.3 Once an AQMA has been designated Section 84 (1) of the Environment Act 1995 states that:

“for the purpose of supplementing such information as it has in relation to the designated area in question, cause an assessment to be made of:

- *The quality for the time being, and the likely future quality within the relevant period, of air within the designated area to which the order relates; and*
- *The respects (if any) in which it appears that air quality standards or objectives are not being achieved, or are not likely within the relevant period to be achieved, within that designated area.”*

1.2 Stage 4 Assessment

1.2.1 The aim of this report is to supplement the information gathered for the Stage 3 Review and Assessment report. The aim of this assessment is to:

- Confirm the original assessment of air quality against the prescribed objectives
- Calculate how much of an improvement in air quality would be needed to deliver the air quality objectives within the AQMA
- Refine knowledge of the sources of pollution
- Take into account local and national policy development
- To carry out real time monitoring where this has not been done as part of stage 1 –3 reviews and assessments.
- To carry out further monitoring in problem areas to check earlier findings
- To check the original designation is still valid and does not need amending in any way
- To respond to any comments made by statutory consultees in respect of stage 1 – 3 reports

1.3 Responses to Stage 3

1.3.1 The comments from Department for Environment, Food and Rural Affairs (DEFRA) in relation to the Stage 3 Review and Assessment consultation are given in Appendix 2.

Chapter 2 - Monitoring in West Wiltshire

2.1 Real Time Analysis

- 2.1.1** Real time analysers are regarded as the most accurate method of monitoring pollutants. West Wiltshire uses API M200A analysers. It measures the concentration of Nitric Oxide (NO) and total oxides of Nitrogen (NO_x) and then by calculation the NO₂ concentration is determined.
- 2.1.2** Until June 17 2003 the analyser was located in a roadside enclosure in Warminster Road, Westbury and is about 8m from the road. The site location can be seen in Appendix 3. The site was chosen originally because it has historically been regarded as a heavily trafficked road which takes a mix of light and heavy duty vehicles. Both commercial and residential properties are situated along the road.
- 2.1.3** On the 17 June 2003 the analyser was relocated to Oval Motors on Warminster Road, Westbury (shown in Appendix 4) The reason for this was to gain more information on NO₂ concentrations in a more confined and populated area of Warminster Road.
- 2.1.4** On the 17 June 2003 another NO₂ analyser was installed in St Margaret's Street, Bradford On Avon. A map showing the exact location can be seen in Appendix 5. This location was chosen because no automatic monitoring has been carried out in this area of the AQMA. Monitoring is needed to confirm the boundary of the AQMA.

2.2 Quality Assurance/Quality Control (QA/QC)

Automatic Calibration

- 2.2.1** To ensure that the information obtained from the analysers is as accurate as possible and to quantify any instrument drifts a stringent QA/QC protocol is followed.
- 2.2.2** The API M200A analyser is subjected to daily automatic calibration. This provides a daily check on the performance of the instrument. It should be noted that these results are not used for instrument scaling.
- 2.2.3** The zero air is generated by passing ambient air through purafil charcoal scrubbers before it is passed into the reaction cell. The span gas is generated by an NO₂ permeation tube containing pure liquid NO₂. The permeation tube is enclosed in an oven which is maintained at a constant temperature. The zero air is passed across the permeation tube at a constant flow rate. Provided the flow rate and temperature are kept constant, the amount of NO₂ permeating from the tube into the air stream will be constant. The gas then produced then passes into the reaction cell and a span calibration response is determined.

Manual Calibration

- 2.2.4** Every two weeks manual calibration checks are carried out. This allows the

instrument drifts to be fully qualified and documented using traceable calibration gas standards and the results are used to scale data.

- 2.2.5** A copy of the calibration checklist can be seen in Appendix 6 of this report.
- 2.2.6** The fortnightly calibration procedure requires a zero check on the analyser. This is achieved by a source of zero air being provided by passing ambient air through the charcoal scrubber before it enters the reaction cell. Once stability has been achieved (this is defined as a variation of less than 0.1ppb over a one minute period for the analyser) three readings are recorded from the instrument display after three ten second intervals. Next the calibration gas bottle is opened at a pressure of 30 psi. The analyser is allowed to stabilise for a minimum of ten minutes. Three consecutive readings are taken from the instrument display, allowing ten seconds between readings. The calibration gas is then isolated.
- 2.2.7** By considering the previous calibration results and the results obtained from the calibration just performed, the success of the calibration procedure is determined. The zero value should not differ by more than ± 2 ppb from the previous calibration. The span calibration should not differ by more than 5% from that obtained during the previous calibration. Additionally, the analyser sample inlet filter is changed when necessary.
- 2.2.8** At the time of the instrument calibration checks, instrument pre-calibration checks are made to ensure that the condition of the analyser, before the calibration check, is assessed and any faults attended to. A copy of the checklist can be seen in Appendix 7 of this report.

Six Monthly Checks

- 2.2.9** These checks are carried out by our analyser suppliers, Enviro Technology Ltd at the same time as they service the equipment. They ensure that the measurements from the analyser are representative and inter-comparable. The calibrations act as an independent audit of the system performance. Additionally, any site-specific problems that may have remained undetected will be fully quantified.

Data Scaling

- 2.2.10** The data obtained from the API M200A analyser is scaled to take into account instrument drift. The data scaled is that which was collected in the two week period before the calibration check was made.

The corrected data is determined using the following formulae:-

Instrument Zero = V_z

Instrument Span (F) = $c/(V_s - V_z)$

Pollutant Concentration (ppb) = $F(V_a - V_z)$

Conversion to $\mu\text{g}/\text{m}^3$ = Pollutant concentration x 1.91

V_z is the response of the analyser when the pollutant being measured is not in the sample air stream.

Vs is the response of the analyser to an accurately known concentration, c.

Va is the recorded signal from the analyser sampling ambient air.

2.3 Automatic Data Results – Westbury and Bradford On Avon

2.3.1 A description of the analysers and the QA/QC protocol have been detailed in paragraphs 2.2.1 to 2.2.10.

Westbury

2.3.2 The data capture at Westbury throughout 2002 was fairly poor at 60%. For the data to be of an acceptable quality the Technical Guidance LAQM.TG(03) states that a data capture rate of 90% is recommended. Due to the poor data capture, data from the last 3 years at the site has been reviewed. Results show an average of 37µg/m³ which is very near to the objective of 40µg/m³.

2.3.3 We have experienced difficulty retrieving data from the relocated analyser in Westbury. At this time we only have just over six weeks data from the Oval Motors site, Warminster Road, Westbury. Currently the data capture rate is 100%. The results can be seen in the table 2.1.

Table 2.1

Automatic NO₂ analyser – Oval Motors, Warminster Road, Westbury	
	2003 average µg/m ³
August (2 weeks)	38
September	45

2.3.4 Although we have experienced some data retrieval problems, it can be seen that it is likely that the objective for nitrogen dioxide will not be met by 2005. However more monitoring data will be required to confirm the initial findings.

Bradford On Avon

2.3.5 Due to problems in retrieving data we currently only have just over 6 weeks data from the analyser situated in St Margaret's Street, Bradford On Avon. However the data capture is currently 100%. The results can be seen in the table 2.2.

Table 2.2

Automatic NO₂ analyser – St Margaret's Street, Bradford On Avon	
	2003 average µg/m ³
August (2 weeks)	32
September	33

2.3.6 Early indications show that there may not be an exceedence of the objective for nitrogen dioxide in St Margaret's' Street in Bradford On Avon. However further monitoring is required to confirm the initial findings.

2.3.7 Diffusion tube data collected within AQMAs

2.3.8 West Wiltshire currently has 4 nitrogen dioxide diffusion tube sites which are located within an AQMA. They are located as follows:

- Masons Lane Bradford On Avon – kerbside location
- Lamp post 21 Warminster Road Westbury – kerbside location
- Lamp post 79 Warminster Road Westbury – kerbside location
- Haynes Road Westbury – kerbside location

2.3.9 Table 2.3 shows the annual average concentrations of nitrogen dioxide at each of the sites in 2002. These locations can be seen on the location maps in Appendix 8. Graphs showing the nitrogen dioxide diffusion tube results can be seen in Appendix 9. Column 3 shows the corrected data using a factor of 1.019 which accounts for any bias in the preparation method. The correction factor has been provided by Cheltenham Borough Council who co-located diffusion tubes (provided by Bristol City Council Scientific Services) at their Montpellier site in 2002, with a chemiluminescence monitor. The diffusion tubes were exposed for a period of 4 weeks and then analysed by Bristol Scientific Services using the TEA in water method. We were advised by the AQM Resource Centre at the University of the West of England that in the absence of any co-location study undertaken by ourselves, this figure could be used. The Cheltenham figure has been used because the diffusion tubes are supplied by Bristol Scientific Services and the same analytical method is used.

Table 2.3

Site Location	2002 annual average $\mu\text{g}/\text{m}^3$	Corrected 2002 annual average $\mu\text{g}/\text{m}^3$	Predicted 2005 annual average $\mu\text{g}/\text{m}^3$	Predicted 2010 annual average $\mu\text{g}/\text{m}^3$
Masons Lane Bradford On Avon	53	54.0	49.7	40.9
Lamp post 21 Warminster Rd Westbury	42	42.8	39.4	32.4
Lamp post 79 Warminster Rd Westbury	47	47.9	44.1	36.3
Haynes Road Westbury	42	42.8	39.4	32.4

2.3.10 The predicted 2005 and 2010 concentrations are obtained through applying a correction factor which is quoted in the Technical Guidance LAQM.TG(03).

2.3.11 It can be seen from these results that Masons Lane in Bradford On Avon and lamp post 79 Warminster Road, Westbury are likely to exceed the annual mean air quality objective in 2005. The other two locations are extremely close to the annual mean objective of $40\mu\text{g}/\text{m}^3$. In addition Masons Lane is predicted to

exceed the Air Quality Daughter Directive annual objective by 2010.

2.3.12 Since May 2003 diffusion tubes have been located in St Margaret's Street, Bradford On Avon for the purposes of a co-location study. The results can be seen in table 2.4.

Table 2.4

	May 2003 µg/m ³	June 2003 µg/m ³	July 2003 µg/m ³	August 2003 µg/m ³	Average µg/m ³
Co-location	33.8	35.2	43.9	40.2	38.27
Diffusion tubes,	37.6	39.7	40.9	33.8	38
St Margaret's St	29.7	32.6	34.5	39	33.95

2.3.13 Although there is quite a variation in the results obtained from the diffusion tubes the results from over a period of four months indicate that the objective for nitrogen dioxide will be met. The small amount of automatic data collected discussed in paragraphs 2.3.4 – 2.3.5 also indicates this.

2.4 Monitoring for PM₁₀ – Bradford On Avon

2.4.1 To monitor PM₁₀ in Bradford On Avon a Turnkey Osiris monitor has been used. It was located in Masons Lane on a lamp post about 1 metre from the road side. This method of monitoring was chosen because of site difficulties. The streets are so narrow that a BAM cannot be installed. This analyser can be installed on a lamp post. Monitoring was undertaken from 19 September 2002 through to 06 January 2003. The site location can be seen in Appendix 8.

2.4.2 This automatic analyser uses a light scattering technique to determine the concentration of airborne particles and dust in the size range 0.4 microns to about 20 microns. The analyser was set specifically to measure particles less than 10 microns in size (PM₁₀). The air sample is continuously drawn into the instrument by a pump at a flow rate of 600cc/min. The incoming dusty air passes through a laser beam in a photometer and then through a filter to remove the particles before reaching the pump. The light scattered by the individual particles is converted into an electrical pulse which is proportional to the size of the particle. The sampling head is not heated and therefore equates to a gravimetric assessment.

2.4.3 Results are obtained on a monthly basis and processed using Turnkey 'AirQ' software. The results are then transferred into a spreadsheet to enable the data to be worked on. The filters are pre-conditioned and weighed by Bristol Scientific Services and after exposure they are sent back to them for weighing. Using the results from the lab the data can then be ratified.

2.4.4 The Osiris was installed for a period of three and a half months. Data capture was 100% over this time. The average concentration over this time was 23 µg/m³ with just 2 exceedences.

2.4.5 From the data collected it appears that the annual mean objective and the 24-hour objective will not be exceeded in 2004. However on consulting with DEFRA as part of or Updating and Screening Assessment they have recommended we carry out a further three months of monitoring to establish if the objective is likely to be met. If the further monitoring confirms the above findings the AQMA order will be altered to reflect these findings. This monitoring has not yet been completed, but the additional results shall be considered as part of our action plan.

Chapter 3 – Dispersion Modelling Methodology

3.1 Background

- 3.1.1** As we have not been able to adequately monitor the air quality within the Air Quality Management Areas we undertook predictive base case air quality modelling to determine the potential extent and possible improvements in air quality.
- 3.1.2** Consultants Faber Maunsell were employed by West Wiltshire District Council to carry out modelling work to establish the existing case in Bradford On Avon with the present road network and to determine the pollutant concentration throughout the town of Westbury and the surrounding area which could be impacted by the proposed by-pass.
- 3.1.3** The AAQulRE model was used. This regional dispersion model uses the dispersion algorithms in CALINE4 and AERMOD, which have been independently and extensively validated.
- 3.1.4** All the scenarios were modelled for 2002, the year for which the traffic model was run. The traffic data was provided by Wiltshire County Council.

3.2 Bradford On Avon

- 3.2.1** Concentrations of nitrogen dioxide (NO₂) and suspended particulate matter (PM₁₀) were predicted for the scenario at over 35,000 receptors set out on a Cartesian grid of 10 metre spacing covering the whole of Bradford On Avon. The results were then compared with the UK National Air Quality Standards.

3.3 Westbury

- 3.3.1** The study area in Westbury was modelled with and without the proposed bypass in operation to assess its impact. To maintain continuity the model was run for 2002 as this was the year for which the traffic model was run. The traffic data were provided by Wiltshire County Council.
- 3.3.2** Concentrations of nitrogen dioxide (NO₂) was predicted for the scenarios at over 80,000 receptors set out on a Cartesian grid of 10 metre spacing covering Westbury and the surrounding area covered by the proposed bypass. The results were then compared with the UK National Air Quality Standards.

3.4 Traffic data and emission factors

- 3.4.1** The method takes into account vehicle numbers, vehicle speeds, the proportion of heavy goods vehicles and changes in future exhaust emissions due to legislation. The roads were digitised by Faber Maunsell.
- 3.4.2** Road transport represents the major source of pollution in the two areas, it was therefore imperative that the emission data was as accurate as possible. Speed related emission factors for the two pollutants were derived from the latest factors supplied on the National Atmospheric Emissions Inventory website.

3.4.3 Diurnal profiles for the different road types were used to represent the average variation of traffic flows in Westbury and Bradford On Avon, and were based on typical variations for these roads.

3.5 Meteorological Data

3.5.1 Faber Maunsell consulted with the Meteorological Office and a meteorological dataset was compiled using data from the nearest suitable station. For the Westbury model data from Yeovilton was used. Windroses from a four year dataset were analysed and the most typical year was selected. In this particular case it was 1999. The windrose for this location can be seen in Appendix 10.

3.5.2 For the Bradford On Avon model the Meteorological Office advised using a meteorological dataset from RAF Lyneham. Windroses from the three most recent years were analysed and the most typical year was selected. The windrose can be seen in Appendix 11.

Chapter 4: Modelling Results

4.1 Results

4.1.1 Contour plots for the base case scenarios in Westbury can be seen in Appendix 12 and the base case scenario for PM₁₀ and NO₂ in Bradford on Avon can be seen in Appendix 13.

4.2 Model Verification for Bradford On Avon

4.2.1 No recent continuous monitoring data was available to verify the model with in Bradford On Avon. The best comparison was with the diffusion tube data for Masons Lane. The concentration at this site for 2002 was 53µg/m³.

4.2.2 Faber Maunsell decided that the disparities between the modelling and monitoring data should be minimised by the methodology outlined in Annex 3 of LAQM.TG(03). By using this methodology, adjustment factors were determined for both modelled NO_x and PM₁₀ concentrations from the concurrent study being performed in Westbury. It was felt that the data from a single diffusion tube site in Bradford On Avon was not sufficient to calculate an adjustment factor.

4.2.3 The adjustment factor used for NO_x was 1.25 and 2.16 for PM₁₀ in order to correct the modelled contribution from road transport.

4.2.4 The concentration from the diffusion tube at Masons Lane was then compared with modelling results. Modelling results along Masons Lane suggest a modelling concentration of 41.5µg/m³. This result suggests that the model is performing reasonably well, but is under predicting at kerbside locations. Further verification will only be possible once continuous monitoring with co-location tubes has been carried out for a number of months.

4.2.5 No PM₁₀ verification was possible for Bradford On Avon due to lack of long term monitoring data.

4.3 Model verification for Westbury

4.3.1 Continuous monitoring of NO₂ was undertaken at Warminster Road which was compared to the modelled results for the same point. The annual mean NO₂ concentration for 2002 at the continuous monitoring site was 27.5µg/m³, whereas the predicted concentration was 24.6µg/m³. Therefore, the model was underpredicting NO₂ concentrations by about 11%.

4.3.2 It was decided that the disparities should be minimised by using the methodology outlined in Annex 3 of LAQM.TG(03). By using this methodology adjustment factors were determined for modelled NO_x concentrations. An adjustment factor of 1.25 for NO_x was used to correct the modelled contribution from road transport.

4.4 Bradford On Avon

4.4.1 Exceedences of the UK National Air Quality Standards for NO₂ and PM₁₀ were

predicted for 2002 in the scenario looked at. Most of the exceedences were predicted along Masons Lane and Silver Street.

4.4.2 The model predictions show that the highest concentrations follow the main north – south route, the A363 through Bradford On Avon. Pollutant concentrations are greater within the town due to congestion and the resulting slower speeds. The highest concentrations were found along Silver Street south of its junction with Masons Lane. Exceedences of both the NO₂ and PM₁₀ standards were predicted along the section of Silver Street and its junction with Masons Lane.

4.5 Bradford On Avon Summary

4.5.1 Concentrations of nitrogen dioxide and PM₁₀ were predicted over the whole of Bradford On Avon on a detailed receptor grid of 10 metres.

4.5.2 Exceedences of the UK National Air Quality Standards in 2002 for NO₂ and PM₁₀ were predicted for the existing case scenario.

4.6 Westbury

4.6.1 The highest concentrations for the base case were along the A350 through the town. The highest concentration of NO₂ was 44.0 µg/m³ at the junction between Warminster Road and Haynes Road.

4.6.2 The impact of the proposed bypass in the development scenario was to greatly reduce the pollutant levels along the A350, the main road through town. The highest predicted NO₂ concentration for this scenario in the town centre, 27.5 µg/m³, was along Leigh Road. The highest levels predicted were along the proposed bypass, with a typical roadside concentration of 35 µg/m³.

4.6.3 A ‘difference plot’ was calculated by subtracting the base case concentrations from those predicted for the development case. The plot indicates that the proposed bypass will reduce the NO₂ concentrations by as much as 40% along the A350 through the town centre. The model also showed a small general reduction in town centre concentrations away from the roads of approximately 1 µg/m³.

4.7 Westbury Summary

4.7.1 Concentrations of nitrogen dioxide were predicted on a detailed receptor grid with a spacing of 10 metres over the whole of Westbury town centre and also for areas likely to be affected by the proposed bypass. The existing case and a scenario including the proposed bypass were both assessed.

4.7.2 The impact of the proposed Westbury bypass scheme was to increase concentrations along the route of the bypass and to lower levels in Westbury town centre.

4.7.3 Roadside annual mean NO₂ concentrations were predicted to drop by up to 16 µg/m³ along the A350 in the vicinity of Warminster Road. This drop was due to reductions in traffic flows by up to 60% and the easing of congestion in the area. Roadside concentrations along the proposed bypass were predicted to rise up to

36 µg/m³. Concentrations in both areas would be expected to decrease with time due to improved emissions controls. These improved controls generally outweigh the impact of any growth in traffic.

Chapter 5: Source Apportionment

5.1 Source Apportionment

5.1.1 In relation to the two air quality management areas, there are no point sources impacting upon the predicted exceedences. They are made up of background and traffic sources. It is possible to estimate the proportion due to background levels and traffic at locations where automatic monitoring has taken place.

Location	Background NO_x	Average NO_x	% Background	% Traffic Related
Masons Lane, Bradford On Avon (2002)	19.6µg/m ³	147.9µg/m ³	13.25%	86.75%
Warminster Rd, Westbury (2002)	19.6µg/m ³	92µg/m ³	21.3%	78.7%

5.1.2 It is not possible to undertake a full source apportionment study as a full local breakdown of vehicle types is not currently available.

5.1.3 No automatic monitoring data is available for Bradford On Avon, however the 2002 average NO₂ result from Masons Lane, Bradford On Avon were used to work out the source apportionment.

5.2 Improvement Needed

5.2.1 In Westbury the highest annual average level of NO₂ was modelled at 40.2µg/m³. Using the NO₂ to NO_x roadside relationship a NO₂ value of 40.2µg/m³ would be 102.5 µg/m³ of NO_x. An improvement of 0.2µg/m³ is required to meet the air quality objective.

5.2.2 In Bradford On Avon the annual average level of NO₂ (collected by diffusion tubes) was 54µg/m³. Using the NO₂ to NO_x roadside relationship an NO₂ value of 53µg/m³ would be 155µg/m³ of NO_x. An improvement of 14µg/m³ is required to meet the air quality objective.

5.3 Abatement Options

5.3.1 The abatement options and their cost effectiveness will be considered within the action plan.

Chapter 6 - Conclusions and Recommendations

6.1 Present air quality

6.1.1 Current monitoring shows that the annual average objective for NO₂ is being exceeded in Masons Lane, Bradford On Avon and in Warminster Road and Haynes Road, Westbury.

6.2 Future air quality

6.2.1 From the modelling work carried out, West Wiltshire District Council consider that the AQMA boundary for Westbury will remain unchanged. However it is likely that further monitoring of PM₁₀ in Bradford On Avon may show that the PM₁₀ concentration will meet the annual objective. Also modelling of NO₂ has indicated St Margaret's' Street in Bradford On Avon may meet the NO₂ annual objective. Before we can formally confirm this we will require further monitoring results. It is anticipated an update will be provided our action plan report.

Abbreviations and Glossary

Abbreviations

AADT	Annual Average Daily Traffic (vehicles per day)
AQMA	Air Quality Management Area
BAM	Beta Attenuation Monitor
CO	carbon Monoxide
NO	nitrogen monoxide, also termed as nitric oxide
NO₂	nitrogen dioxide
NO_x	nitrogen oxides
PM₁₀	particulate matter with an (equivalent aerodynamic) diameter of ten microns (10 µm) or less
SO₂	sulphur dioxide
WASP	Workplace Analysis Scheme for Proficiency

Glossary

Air Quality Objective	Policy targets generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specified timescale
Annual mean	The average of the concentrations measured for each pollutant for one year. In the case of the Air Quality Objectives this is for a calendar year.
AQMA	Air Quality Management Area, an area where a local authority has designated for action, based upon predicted exceedences of Air Quality Objectives.
Chemiluminescence	The emission of absorbed energy as light during a chemical reaction. The measurement of the light emitted can give a measure of the concentration of one of the reactants if the other one is known.
Data Capture	The percentage of all the possible measurements for a given period that were validly measured.

exceedence	A period of time where the concentration of a pollutant is greater than the appropriate Air Quality Objective.
Microgramme (µg)	One millionth of a gramme
Mg/m³	milligrammes per cubic meter of air. A unit for describing the concentration of air pollutants in the atmosphere, as a mass of pollutant per unit volume of clean air. This unit is one thousand times larger than the µg/m ³ unit listed below.
µg/m³	microgrammes per cubic meter of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m ³ means that one cubic meter of air contains one microgram (millionth of a gram) of pollutant.