



Air Quality Progress Report 2007

Worcester City Council

Document Control

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Job Number	J614
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Document Status and Review Schedule

Issue No.	Date	Status	Reviewed by
1	16 April 2007	Draft report	Professor Duncan Laxen
2	23 May 2007	Final Report	Professor Duncan Laxen
3			

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Executive Summary

This Progress Report has been prepared for Worcester City Council to satisfy a requirement of the Environment Act 1995 to periodically review and assess air quality locally. The role of this process is to provide an update on air quality issues, including developments that might impact on air quality and the results from air quality monitoring over the last 12-month period. A third round of review and assessment is currently underway, and Worcester City Council submitted their Updating and Screening Assessment in 2006.

Earlier rounds of review and assessment in Worcester were completed in 2001 and 2004 respectively. Following both rounds of assessment, no exceedences of any of the air quality objectives were found or were predicted. This report focuses on changes that have occurred since the submission of the Updating and Screening Assessment (USA).

The conclusions of this report are that there have been no significant changes in emission sources since the previous round of review and assessment. However, monitoring has indicated that there are exceedences of the annual mean nitrogen dioxide objective at three relevant locations in Worcester. These locations are as follows:

- Bridge Street
- Dolday
- Whittington Road

As part of this third round of assessment, Worcester City Council will therefore be required to undertake a Detailed Assessment for nitrogen dioxide for submission in 2008. This assessment will determine whether an Air Quality Management Area is required for any of the specified locations in Worcester. The Detailed Assessment for nitrogen dioxide will also include the Lowesmoor area of the City. Nitrogen dioxide diffusion tube results in the Lowesmoor area have been found to be high in previous air quality reporting, and the 2006 USA concluded that an AQMA may be necessary in this location. The Detailed Assessment will review all previous data from this location in relation to relevant exposure.

In addition, potential exceedences of the three sulphur dioxide air quality objectives have been found at the continuous analyser site in Dolday. A Detailed Assessment will be undertaken to determine whether such exceedences do in fact exist or whether the data from 2006 have been a result of malfunction of the sulphur dioxide analyser.

Summary of the Conclusions of the 2007 Progress Report

Pollutant	Conclusion
Carbon monoxide	No requirement for a Detailed Assessment
Benzene	No requirement for a Detailed Assessment
1,3-butadiene	No requirement for a Detailed Assessment
Lead	No requirement for a Detailed Assessment
Nitrogen dioxide	Detailed Assessment required at four locations
Sulphur dioxide	Detailed Assessment required in the vicinity of Dolday
PM ₁₀	No requirement for a Detailed Assessment

1 Introduction

- 1.1 This report provides an update on the progress with local air quality management in the City of Worcester. This assessment is part of the statutory duty placed on local government to assess local air quality regularly, under Part IV of the Environment Act 1995 and the Air Quality (England) Regulations 2000 and subsequent Air Quality (England)(Amendment) Regulations 2002.
- 1.2 This report follows on from the Council's submission of an Updating and Screening Assessment (USA) to Defra in 2006. There were no exceedences of any of the air quality objectives reported in the Council's USA. Local government is required to submit a Progress Report in the intervening years between the submission of a USA and any Detailed Assessment work (see Appendix 1 for the air quality review and assessment timetable).

2 Local Air Quality Management Framework

Introduction

- 2.1 The Government's Air Quality Strategy for England, Scotland, Wales and Northern Ireland¹ and the addendum to it, published in February 2003², set out a framework for managing local air quality, which includes a series of air quality objectives. National and international measures are likely to achieve these objectives in most locations, but where areas of poor air quality remain, local air quality management is necessary. Part IV of the Environment Act 1995 requires local authorities to periodically review and assess air quality in their area. The role of this process is to identify areas where it is unlikely that the air quality objectives are, or will be, achieved. These locations must be designated as Air Quality Management Areas (AQMAs) and an Air Quality Action Plan prepared to improve air quality within the AQMAs.
- 2.2 The Government's Air Quality Strategy defines both standards and objectives for each of a range of air pollutants. The 'standards' are set as concentrations below which health effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of a particular pollutant. The 'objectives' set out the extent to which the Government expects the standards to be

¹ DETR (2000). Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

² Defra (2003). Air Quality Strategy for England, Scotland, Wales and Northern Ireland Addendum.

achieved by a certain date. They take account of the costs, benefits, feasibility and practicality of achieving the standards.

- 2.3 The air quality objectives are prescribed within the Air Quality (England) Regulations 2000³ and the Air Quality (England) (Amendment) Regulations 2002⁴. These latter regulations set revised, more stringent objectives for benzene and carbon monoxide. The objectives for nitrogen dioxide and PM₁₀ were to have been achieved by 2005 and 2004 respectively, and will continue to apply in all future years thereafter. The Air Quality Strategy Addendum (Defra, 2003⁵) proposed a set of more stringent provisional objectives for PM₁₀ to be achieved by 2010. However, the recent review of the Air Quality Strategy (Defra, 2006⁶) indicates that these provisional PM₁₀ objectives will not be brought into Regulation. There is thus no requirement to assess air quality against them and they are not discussed further. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below 60 µg/m³ (Laxen and Marnar, 2003⁷).
- 2.4 Air quality objectives are only applicable where members of the public are likely to be regularly present and are likely to be exposed over the averaging time of the objective. For annual mean and 24-hour objectives, relevant exposure is focused on residential properties, schools and hospitals. The 1-hour and 15-minute objectives apply at these and any outdoor location where a member of the public might reasonably be expected to stay for the averaging period of the objective, such as shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.
- 2.5 The Local Air Quality Management Technical Guidance (LAQM.TG(03))⁸ and the 2006 revision of the technical guidance⁹ establish the approach to Review and Assessment. Specific government guidance on Progress Reports¹⁰ is provided for local authorities, which has been used in the preparation of this report.

Review and Assessment Round 1

³ The Air Quality (England) Regulations 2000, Statutory Instrument 928

⁴ The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043

⁵ Defra (2003). Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum. February 2003.

⁶ Defra (2006). Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum. Consultation document on options for further improvements in air quality. Defra 2006

⁷ Laxen and Marnar (2003). Analysis of the Relationship Between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites.

⁸ Defra, National Assembly for Wales, Scottish Executive and DoE Northern Ireland (February 2003), Local Air Quality Management, Technical Guidance LAQM.TG(03).

⁹ Defra, National Assembly for Wales, Scottish Executive and DoE Northern Ireland (January 2006), Local Air Quality Management, Technical Guidance LAQM.TG(03) Update.

¹⁰ Defra and National Assembly for Wales (2003). LAQM Progress Report Guidance LAQM.PRG(03).

- 2.6 Worcester City Council undertook a Stage 1 and Stage 2 assessment as part of their Round 1 air quality assessment work. A number of Part B processes required some further assessment work at Stage 2, together with traffic emissions relating to the A38, A4, A449 and the B4205. At Stage 2, the Council concluded that there was no requirement for any further assessment of any pollutant, and as such there was no requirement for any AQMA to be designated.

Review and Assessment Round 2

- 2.7 The second round of assessment began with the submission of an Updating and Screening Assessment (USA) in 2003. The USA was based upon a checklist approach, whereby sources identified previously and any new sources were considered in terms of their air quality significance. No further assessment was required following the USA, and Worcester City Council was therefore required to submit a Progress Report in 2004. There was no requirement for a Detailed Assessment.
- 2.8 Subsequently, Progress Reports were submitted by the Council in 2004 and 2005, both indicating that further assessment was not required by the Council, with no predicted or current exceedences of any of the air quality objectives reported.

Review and Assessment Round 3

- 2.9 Worcester City Council submitted an Updating and Screening Assessment in 2006, and concluded that a Detailed Assessment was not required for any pollutant. This Progress Report constitutes the next requirement of Round 3.
- 2.10 As with all rounds of review and assessment, where a local authority identifies a possible exceedence of one or more of the air quality objectives, the local authority is required to proceed to a Detailed Assessment directly. The local authority is not required to wait until a particular reporting time.

3 Air Quality Monitoring

- 3.1 Progress Reports provide an important mechanism for reporting on all available monitoring data, in a form suitable for comparison with the relevant air quality objectives. Worcester City Council

routinely monitors for a number of the pollutants within the Air Quality Strategy, using both automatic and passive diffusion tube samplers.

Continuous monitoring

- 3.2 Worcester City Council monitors continuously for nitrogen oxide, nitrogen oxides, nitrogen dioxide, sulphur dioxide and PM₁₀. An Ambirak air quality monitoring system is used, with a chemiluminescent analyser being used to monitor nitrogen oxide, nitrogen oxides and nitrogen dioxide and a UV fluorescence analyser used to monitor sulphur dioxide and a TEOM is used to monitor PM₁₀.
- 3.3 The Ambirak monitor is located along the Dolday in Worcester, close to the junction with The Butts road, along the B4205. There are new flats within 15 metres of the monitoring station, and the Council co-locates two nitrogen dioxide diffusion monitoring tubes at the site. The automatic analysers are automatically calibrated on a daily basis.
- 3.4 In addition to the TEOM, the Council operates three Osiris Turnkey Environmental Dust Monitors, positioned at three different locations within the city. These instruments draw air through a laser beam in a photometer, which converts the light scattered by the dust particles into an electrical signal, proportional to the particle size. Calibration factors are then applied to these data to take account of particle density, and the final output data is in the form of mass concentration ($\mu\text{g}/\text{m}^3$). The information is downloaded on a daily basis to a computer where a daily print out of the result is shown.
- 3.5 These monitors are mobile, and can simultaneously monitor concentrations of PM₁₀, PM_{2.5} and PM₁ particles. They are sensitive to airborne particle concentrations down to $0.01\mu\text{g}/\text{m}^3$. An Osiris monitor is therefore a flexible tool in obtaining an indicative PM₁₀ concentration in the areas of the city most likely to require further monitoring.
- 3.6 The Osiris monitors are located at St Johns, Bridge Street and Rainbow Hill within the city. Monitoring data is available from 2003 from each of the three monitors. All three monitors are positioned in relevant locations with respect to public exposure.
- 3.7 A full factory service and calibration is carried out by the equipment supplier on a 6-monthly basis for the Osiris monitoring equipment. An engineer is on call in case of malfunction. If there are any abnormal readings, an officer can go to the unit to check for any faults, such as the pump not functioning, a power failure and the modem not resetting itself.

Diffusion tube monitoring

- 3.8 Worcester City Council uses diffusion tubes supplied and analysed by Gradko International, using the 20% TEA in water preparation method. There are currently 25 diffusion tube monitoring sites, of which 11 are new monitoring sites as of 2006. Appendix 3 provides a list of all 25 diffusion tube monitoring locations with respect to their specific position and distance to relevant receptors. The new monitoring sites initiated in 2006 include kerbside and urban background locations. Four diffusion tube monitoring sites became obsolete during 2006.

4 Air Quality Monitoring Results

- 4.1 All the monitoring results from the continuous analysers and nitrogen dioxide diffusion tube monitoring are provided in this section. Results are provided on an individual pollutant basis.

Carbon monoxide (CO)

- 4.2 Previous local air quality reporting has not identified any relevant or significant sources of carbon monoxide emissions. There are no roads that meet the government requirements to undertake a more detailed assessment for carbon monoxide, as Annual Average Daily Flow (AADF) are <80,000 on single carriageways and <140,000 on motorways within Worcester City. The highest projected traffic flow on any road within the area is 117,513 for 2010, for locations north of Junction 6 of the M5.
- 4.3 No carbon monoxide monitoring is undertaken by the Council. No further assessment is therefore required for carbon monoxide.

Benzene

- 4.4 Routine monitoring of benzene is not undertaken in Worcester. The last monitoring undertaken was in 1999. There was no requirement to undertake any further assessment on the basis of this monitoring.
- 4.5 Previous local air quality reporting has identified relevant authorised petrol stations with a petrol throughput of >1000m³ as being the only likely benzene emission source. Following a review of their location, there are no petrol stations that have required any further assessment. No further assessment is required for benzene.

1,3-butadiene

- 4.6 No monitoring of 1,3-butadiene is undertaken by the Council. A review of background monitoring data has not indicated any significant concentrations of 1,3-butadiene in Worcester.
- 4.7 Previous air quality reporting has not identified any relevant industrial sources of 1,3-butadiene emissions. No further assessment is required for 1,3-butadiene.

Lead

- 4.8 In previous air quality work, Worcester identified 5 industrial processes with the potential for emitting lead. Following a review of these processes, it was established that lead would not be a problem given the controls in place to reduce lead emissions.
- 4.9 Monitoring for lead is not undertaken with Worcester, and a review of background monitoring data has not indicated any significant concentrations of lead in Worcester. No further assessment is required for lead.

Nitrogen dioxide

Continuous monitoring data

- 4.10 The continuous monitor is located at along the Dolday in Worcester, close to the junction with The Butts road, along the B4205. The results for 2006 are provided in Table 1 below, together with results for previous years when the monitor was at different locations. The results from the continuous monitoring undertaken for nitrogen dioxide between 2003 and 2005 are also provided to illustrate the variable performance of the analyser in respect to data capture.
- 4.11 The data capture for 2006 was 57%, which is considered very low. Data capture was also low in 2003. This was accounted for by equipment failure and data logging problems. There is no earlier available data for Dolday, as the monitor was positioned at other locations across the City, as illustrated in Table 1 below.

Table 1. Nitrogen dioxide Continuous Monitoring Data Between 2003 and 2006 (in $\mu\text{g}/\text{m}^3$).

Monitoring period	Location of monitor	Annual Mean	Data capture
2003	Newtown Road	21.5	63%
2004	Bransford Rd.	17.2	99%
2005	Lowesmoor	8.9	99%
2006	Dolday	21.3	57%

- 4.12 From the data in Table 1, the annual mean objective does not appear to be exceeding $40\mu\text{g}/\text{m}^3$ in the vicinity of Dolday in Worcester, nor any of the other monitoring sites. There are no predicted exceedences of the hourly mean. In contrast, nitrogen dioxide diffusion tube data, from two tubes (presented in the subsequent section) indicate that the nitrogen dioxide annual mean objective is being exceeded at the Dolday.
- 4.13 Similarly, the results for Lowesmoor in 2005 are very low compared to co-located diffusion tube data, as reported in the 2006 USA.
- 4.14 Limited ratification of the 2006 data set has revealed that a significant proportion of the data is invalid. This is explained by the regular malfunction of the analyser, which is to be explored further as part of the Detailed Assessment to be undertaken over the next 12 months. Operational and calibration procedures are to be reviewed in light of the 2006 monitoring results from the continuous analyser.

Diffusion tube monitoring data

- 4.15 The results from the nitrogen dioxide diffusion tube monitoring for 2006 are provided in Table 2 on page 12. In order to account for any bias in the diffusion tube data, local authorities are required to correct monitoring data using appropriate adjustment factors. The factors can be derived from local authority co-location studies, whereby diffusion tubes are located alongside a continuous analyser.
- 4.16 Using the methodology from government Technical Guidance (LAQM.TG(03)), the bias adjustment factor can be calculated using the results from the continuous analyser and the two diffusion tubes

collocated with the analyser. The 2006 annual mean from the two duplicate diffusion tubes located alongside the nitrogen dioxide continuous analyser at Dolday was $43.2\mu\text{g}/\text{m}^3$. However, due to the abnormally low concentrations from the nitrogen dioxide continuous analyser, these results are not used to provide an adjustment factor.

4.17 Alternatively, bias adjustment factors are available on the web¹¹ from studies of diffusion tube performance across the UK. Worcester City Council's diffusion tube monitoring data have been adjusted using the appropriate factor for the diffusion tubes used. Ten studies were used in arriving at this factor.

4.18 From the results in Table 2, there are three relevant locations in Worcester where the nitrogen dioxide annual mean objective appears to be exceeded. These are:

- Bridge Street (flats within 5 metres of the diffusion tubes);
- Dolday (new flats within 15 metres of the continuous analyser and the diffusion tubes), and
- Whittington Road (houses within 20 metres of the dual carriageway).

Each of the three locations appears to be representative of relevant exposure. Worcester City Council will therefore be required to undertake a Detailed Assessment for these locations in 2008.

¹¹ See <http://www.uwe.ac.uk/aqm/review/diffusiontube260207.xls>

Table 2. Location of nitrogen dioxide Diffusion Tubes and 2006 Monitoring Data (raw and bias adjusted values)

Site	Location	Position of tube	Relevant exposure	Months of data	Mon. data	Adj. An. Average*
1. Bridge Street	K	Lamp post by John Gwen House near bridge	Yes - flats 5m	12	49.0	47.8
2. Bromwich Road	K	Lamp post (9600) on roundabout, Lowerwick/Malvern exit	Yes - houses 20m	10	27.8	27.3
3. King Charles Place	K	Under Osiris by the bakery	No	11	44.9	44.0
4. McIntyre Road	UB	Lamp post, last house on left before car park	Yes - houses 8m	12	18.7	18.3
5. Henwick Road	K	Lamp post (11020), bus stop past Uni entrance before junction	Yes - houses 15m	11	21.0	20.6
6. Ambrack 1	K	Dolday	Yes - new flats 15m	12	44.4	43.5
7. Ambrack 2	K	Dolday	Yes - new flats 15m	12	41.9	41.1
8. Castle Street	K	Lamp post between Mags Ct and Police Property Office	No	11	30.8	30.2
9. Droitwich Road	K	Lamp post (1903) opposite Blooms Garden centre	No	8	23.2	22.7
10. Bilford Road	K	Lamp post (1552) near roundabout on RHS before Beech Avenue	Yes - houses 8m	11	32.0	31.4
11. Windermere Drive	K	Lamp post opposite junction to Cranham Drive	Yes - houses 8m	11	36.6	35.8
12. Astwood Road	UB	Lamp post LHS inside gates to Cemetary	No	12	19.3	18.9
13. Plantation Drive	K	Lamp post (0652) near post box and dog bin on LHS, after Purleigh Avenue	Yes - houses 20m	11	27.1	26.6
14. Newtown Road	K	Lamp post (7570) near walkway, opposite new offices next to hospital	Yes - houses 15m	11	39.5	38.7
15. Vicar Street	K		No	12	57.2	56.1
16. Lowesmoor Estate	B	Lamp post on LHS as enter estate	No	12	41.4	40.6
17. Lowesmoor Crossing	K		Yes – flats above shops 5m	12	59.4	58.2
18. St Martins Gate	K	Lamp post on roundabout next to ex-Jaguar garage	No	12	46.7	45.8
19. Larkhill Road	K	Lamp post (6148) near to Tesco Express	Yes - houses 10m	11	34.6	33.9
20. Whittington Road	K	Lamp post (1151) in lay-by before turning to The Swan @ Whittington	Yes - houses 20m	10	45.1	44.2
21. Abbotsbury Court	K	Lamp post on roundabout near entrance to shops and new church	No	11	24.2	23.7
22. Ketch	K	Park at viewing point car park. Weather station/data mast near bridge	No	10	28.6	28.1
23. Bath Road	K	Lamp post outside Stars Newsagents, next to 30 mph sign	No	9	27.6	27.0
24. Sidbury	K	Main traffic lights post	No	11	56.7	55.6
25. Guildhall	UB	Drain pipe in car park, back of HMV	No	11	22.8	22.4

* adjusted using 2006 bias adjustment factor provided on the Review and Assessment website. The values in bold are for sites exceeding the objective, with nearby relevant exposure.

Trends in nitrogen dioxide concentrations

- 4.19 Diffusion tube monitoring data from 2003 to 2006 are provided in Appendix 4 to illustrate trends in annual mean concentrations over recent years. The data presented have been bias adjusted using the available bias adjustment factor on the web and not from the local collocation study.
- 4.20 There is no clear trend in annual mean concentrations over recent years. For the most part, there has been little change in concentrations between 2005 and 2006, with the tubes alongside the Dolday site being the exception. Monitoring here began in 2004, and since then there has been a three-fold increase in the concentrations of nitrogen dioxide. Reasons for this significant increase are to be explored as part of the forthcoming Detailed Assessment work. All sites appeared to have experienced a reduction in annual mean concentration during 2004.

PM₁₀

- 4.21 Monitoring results for 2006 from the three Osiris monitors are presented in Table 3 below. Results from the previous three years are also provided to highlight any trends.

Table 3. 2003-2006 PM₁₀ monitoring data from the Osiris monitors

Location of monitor	Criteria	2003	2004	2005	2006
Osiris 1 (St. Johns)	Annual mean	50.82	25.99	21.24	19.4
	No. exceedences of 24-hr mean objective	99	33	18	7
	Data capture	80%	79%	95%	85%
Osiris (Bridge Street)	Annual mean	15.01	53.54	19.26	20.3
	No. exceedences of 24-hr mean objective	3	126	10	8
	Data capture	88%	88%	78%	94%
Osiris (Rainbow Hill)	Annual mean	19.49	11.80	21.83	3.3
	No. exceedences of 24-hr mean objective	8	2	6	0
	Data capture	76%	89%	95%	99%

- 4.22 Monitoring results from the Osiris monitors indicate that there were no exceedences of either of the two objectives for PM₁₀.
- 4.23 Monitoring results from the TEOM, positioned at Dolday in 2006, indicate an annual mean of 21.9µg/m³ and 17 exceedences of the 24-hour mean. Therefore both PM₁₀ objectives are met currently. However, data capture in 2006 was only 73%, which is considered poor.

Sulphur dioxide

- 4.24 The sulphur dioxide concentrations measured at Dolday during 2006 are set out in Table 4, together with results from other sites in previous years.

Table 4. Sulphur Dioxide Monitoring Data (2003 to 2006)

Criteria	2003 (Newtown Hospital car park)	2004 (Bransford Road)	2005 (Lowesmoor)	2006 (Dolday)
Exceedences 15-min mean objective (35 allowed)	1	4	0	531
Exceedences hourly mean objective (24 allowed)	0	0	0	27
Exceedences 24-hourly mean objective (3 allowed)	0	0	0	23
Annual Average	2.4	1.9	4.4	25.0
Data Capture	63%	99%	99%	72%

- 4.25 In 2006, there were an abnormally high number of exceedences of all three sulphur dioxide air quality objectives in comparison with the data from the previous three years. Although the monitoring station is located in close proximity to a bus station in Worcester, there are no significant sulphur dioxide sources locally. The monitoring data therefore suggests a significant malfunction of the sulphur dioxide monitor. The performance of the monitoring equipment at this location, given the high number of exceedences identified, is to be explored further as part of the Detailed Assessment in 2008.

5 Policy Developments

- 5.1 Local authorities are encouraged to review policy developments that might affect the local air quality in their area. As such, the Progress Report provides an ideal opportunity to report on progress with the Local Transport Plan and Air Quality Strategies, as well as local developments and new planning policies. The following provides an update on these matters and an indication of their impact on local air quality in Worcester.

Local Transport Plan

- 5.2 In July 2005, Worcestershire County Council published its Provisional Local Transport Plan for 2006-11 (LTP2), setting out the proposed future transport strategy for the County as a whole. The Strategy intends to reduce vehicle emissions from transport activity across the County. From the LTP, it is clear that the greatest emerging pressure on the transport network is concentrated in Worcester itself.
- 5.3 A number of initiatives within the LTP will impact on local air quality within Worcester. These include a Sustainable Travel Towns Initiative, which aims to increase the proportion of journeys on foot, by cycle and by bus. Another initiative, Project Express, is a bus-based initiative aimed at reducing the impact of car traffic in the city centre through the provision of a network of park and ride schemes across the city. However, this initiative will not necessarily reduce pollutant emissions within the city.
- 5.4 A major transport proposal is for the construction of Worcester Parkway railway station. This would provide access to national long distance rail networks for Worcestershire as a whole and improve the interchange between local and regional lines, including the Bristol to Birmingham line.
- 5.5 An upgrade of the A4440 Worcester Southern link road is planned, to provide long-term improvements to this particular road. This is one of two vehicle crossings over the river Severn in the Worcester area. The A4440 is the most heavily congested road in the County.
- 5.6 Worcester City Centre is identified as a *sensitive area* within the LTP, being a location where exceedences of the air quality objectives are borderline and therefore sensitive to any significant traffic increases in future.
- 5.7 The pollution level within any future AQMA is to be an indicator within the LTP (indicator LTP8), used to assess the impact of LTP proposals on projected air quality levels. Annual mean nitrogen dioxide concentrations are considered within potential AQMAs as the method of assessment against targets.

Local Air Quality Strategy

- 5.8 Local air quality management policy guidance (LAQM.PG(03)) strongly recommends that local authorities develop air quality strategies, either as an individual local authority or as a group of local authorities. This is particularly important for local authorities that have not declared AQMAs.
- 5.9 Worcester City Council does not have a Local Air Quality Strategy as yet. However, in collaboration with the five other local authorities of Worcestershire, Chief Officers have requested that the feasibility of an Air Quality Strategy for the whole of the County be considered. Because of the nature of the region's formal Pollution Group, the County meets with Herefordshire Council, and a decision has been put forward to join with Herefordshire Council in developing an Air Quality Strategy for the whole of the Hereford and Worcestershire Pollution Group area.
- 5.10 The Hereford and Worcestershire Pollution Group is therefore preparing to develop an area-wide Strategy that will consider all aspects of local air quality management and the links to be made with transport planning, land-use planning, climate change and other policy areas.

Planning Policies and New Local Developments

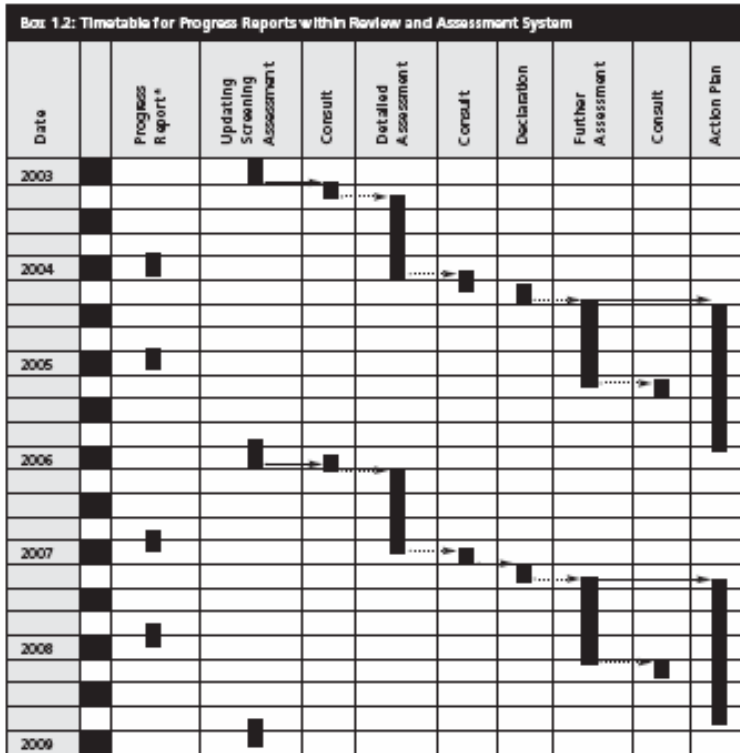
- 5.11 The Region Spatial Strategy for the West Midlands recognises Worcester's role as a sub-regional focus for future development from 2011. Over 500 homes and associated employment sites are proposed. A major land use and transportation study is underway to consider how current constraints in transportation can be overcome to accommodate such major future growth.
- 5.12 The Local Plan provides an indication of a number of development proposals which will impact on the transport network and have an implication for local air quality. The main proposals are as follows:
- Employment Sites – Worcester Woods, Grove Farm, Tolladine Goods Yard, Newtown Road corridor;
 - Housing Developments – Diglis Basin, Earls Court, Worcester Porcelain, various smaller proposals;
 - Retail Development – Lowesmoor;
 - University College expansion onto former Hospital site, and
 - Library proposals adjacent to new UCW site.
- 5.13 With respect to policies linking air quality and planning within Worcester City Council, the Council's Development Plan Document (DPD) on Development Control Policies currently has a plan to

delete a policy on protection from pollution (Policy BE28) on the basis that PPS23 provides an adequate policy basis for controlling development. This was the status of the policy as of November 2006.

6 Conclusions and recommendations

- 6.1 Monitoring data from Worcester City Council's continuous analysers and diffusion tube network have been reviewed to determine whether there is any potential for exceedences of any air quality objective at any particular location within the city.
- 6.2 Exceedences of the nitrogen dioxide annual mean objective have been identified at four specific locations (Bridge Street, the Dolday, Whittington Road and Lowesmoor) from diffusion tube results. A Detailed Assessment will be undertaken for each of these four locations. If such exceedences are confirmed by a Detailed Assessment, Worcester City Council will be required to declare Air Quality Management Areas following a period of consultation in 2008.
- 6.3 The continuous monitoring data for 2006 were abnormally high in respect of sulphur dioxide concentrations and abnormally low in respect of nitrogen dioxide concentrations. Collocated nitrogen dioxide diffusion tubes indicate that the continuous nitrogen dioxide analyser is not performing well. The same may also be the case for the sulphur dioxide analyser.
- 6.4 In light of the above, a Detailed Assessment of sulphur dioxide in the vicinity of Dolday is to be undertaken, to determine whether sulphur dioxide is in fact an issue in the locality. A review of all continuous data from the Ambirak will be carried out as part of the forthcoming Detailed Assessment in light of the poor data capture and the inconsistency in monitoring results over recent years from the monitoring system.
- 6.5 Finally, the Detailed Assessment for nitrogen dioxide, as mentioned above, is also to include the Lowesmoor area of the City. Nitrogen dioxide diffusion tube results have been found to be high in previous air quality reporting, and the 2006 USA concluded that an AQMA may be necessary in this location. The Detailed Assessment will review all previous data from this location in relation to relevant exposure.

Appendix 1. Air Quality Review and Assessment Timetable



* This timetable for Progress Reports does not apply in Northern Ireland, nor in London in 2004. It also does not apply for any authority carrying out a Detailed Assessment in 2003/4 and 2006/7.

Appendix 2. National Air Quality Objectives

Pollutant	Time Period	Objective	To be achieved by ¹
Benzene	Running annual mean	16.25 µg/m ³	2003
	Annual mean	5 µg/m ³	2010
1,3-Butadiene	Running annual mean	2.25 µg/m ³	2003
Carbon Monoxide	Maximum daily running 8-hour mean	10 mg/m ³	2003
Lead	Annual mean	0.5 µg/m ³	2004
	Annual mean	0.25 µg/m ³	2008
Nitrogen dioxide	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year	2005
	Annual mean	40 µg/m ³	2005
Sulphur Dioxide	1-hour mean	350 µg/m ³ not to be exceeded more than 24 times a year	2004
	24-hour mean	125 µg/m ³ not to be exceeded more than 3 times a year	2004
	15-minutes mean	266 µg/m ³ not to be exceeded more than 35 times a year	2005
Fine particles (PM₁₀)²	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year	2004
	Annual mean	40 µg/m ³	2004
	24-hour mean ³	50 µg/m ³ not to be exceeded more than 7 times a year	2010
	Annual mean ³	20 µg/m ³	2010

¹ The achievement dates are all by the end of the specified year.

² Measured by the gravimetric method.

³ Provisional objectives not included in the Regulations.

Appendix 3. Location of the 25 Nitrogen Dioxide Diffusion Tubes in Worcester.

Site	Location ¹	Position of diffusion tube	Relevant exposure	Year monitoring started
1. Bridge Street	K	Lamp post by John Gwen House near bridge	Yes - flats 5 metres	1997
2. Bromwich Road	K	Lamp post (9600) on roundabout, Lowerwick/Malvern exit	Yes - houses 20 metres	2006
3. King Charles Place	K	Under Osiris by the bakery	N	1997
4. McIntyre Road	UB	Lamp post, last house on left before car park	Yes - houses 8 metres	1997
5. Henwick Road	K	Lamp post (11020), bus stop past Uni entrance before junction	Yes - houses 15 metres	2006
6. Ambirack 1	UB	Dolday	Yes - new flats 15 metres	2004
7. Ambirack 2	UB	Dolday	Yes - new flats 15 metres	2004
8. Castle Street	UB	Lamp post between Mags Ct and Police Property Office	N	2003
9. Droitwich Road	K	Lamp post (1903) opposite Blooms Garden centre	N	2006
10. Bilford Road	K	Lamp post (1552) near roundabout on RHS before Beech Avenue	Yes - houses 8 metres	2006
11. Windermere Drive	K	Lamp post opposite junction to Cranham Drive	Yes - houses 8 metres	1997
12. Astwood Road	UB	Lamp post LHS inside gates to Cemetary	N	1997
13. Plantation Drive	K	Lamp post (0652) near post box and dog bin on LHS, after Purleigh Avenue	Yes - houses 20 metres	2006
14. Newtown Road	K	Lamp post (7570) near walkway, opposite new offices next to hospital	Yes - houses 15 metres	2003
15. Vicar Street	K		N	1997
16. Lowesmoor Estate	B	Lamp post on LHS as enter estate	N	2005
17. Lowesmoor Crossing	K		Y - flats above shops 5 metres	1997
18. St Martins Gate	K	Lamp post on roundabout next to ex-Jaguar garage	N	1997
19. Larkhill Road	K	Lamp post (6148) near to Tesco Express	Yes - houses 10 metres	2006
20. Whittington Road	K	Lamp post (1151) in lay-by before turning to The Swan @ Whittington	Yes - houses 20 metres	2006
21. Abbotsbury Court	K	Lamp post on roundabout near entrance to shops and new church	N	2006
22. Ketch	K	Park at viewing point car park. Weather station/data mast near bridge	N	2006
23. Bath Road	K	Lamp post outside Stars Newsagents, next to 30 mph sign	N	2006
24. Sidbury	K	Main traffic lights post	N	1997
25. Guildhall	UB	Drain pipe in car park, back of HMV	N	2006

¹ K = kerbside, B = background, UB = urban background

Appendix 4. Trends in Nitrogen Dioxide Concentrations from Diffusion Tube Monitoring, 2003-2006.

Site	Location	Relevant exposure	Year mon. started	Adjusted data			
				2003	2004	2005	2006 ¹
1. Bridge Street	K	Y	1997	53.2	38.6	46.4	47.8
2. Bromwich Road	K	Y	2006				27.3
3. King Charles Place	K	N	1997	49.0	31.1	44.3	44.0
4. McIntyre Road	UB	Y	1997	27.7	14.8	19.1	18.3
5. Henwick Road	K	Y	2006				20.6
6. Ambirack 1	UB	Y	2004		14.8	29.8	43.5
7. Ambirack 2	UB	Y	2004		14.9	29.9	41.1
8. Castle Street	UB	N	2003	37.1	25.2	32.1	30.2
9. Droitwich Road	K	N	2006				22.7
10. Bilford Road	K	Y	2006				31.4
11. Windermere Drive	K	Y	1997	38.5	28.0	35.1	35.8
12. Astwood Road	UB	N	1997	24.1	16.5	20.4	18.9
13. Plantation Drive	K	Y	2006				26.6
14. Newtown Road	K	Y	2003	43.3	31.9	38.3	38.7
15. Vicar Street	K	N	1997	54.3	43.4	53.6	56.1
16. Lowesmoor Estate	B	N	2005			30.7	40.6
17. Lowesmoor Crossing	K	Y	1997	67.8	50.5	59.8	58.2
18. St Martins Gate	K	N	1997	54.8	37.1	44.8	45.8
19. Larkhill Road	K	Y	2006				33.9
20. Whittington Road	K	Y	2006				44.2
21. Abbotsbury Court	K	N	2006				23.7
22. Ketch	K	N	2006				28.1
23. Bath Road	K	N	2006				27.0
24. Sidbury	K	N	1997	65.2	46.2	52.1	55.6
25. Guildhall	UB	N	2006				22.4

¹ adjusted using 2006 bias adjustment factor provided on the Review and Assessment website. The values in bold are for sites exceeding the objective, with nearby relevant exposure.