

2011 Air Quality Progress Report for **Gloucester City Council**

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

November 2011

A Report to DEFRA and Gloucester City Council

This report uses a template provided by DEFRA and thus does not follow City Council design standards

Local Authority Officer	Gareth Hooper
--------------------------------	---------------

Department	Environmental Protection
Address	Herbert Warehouse The Docks Gloucester GL1 2EQ
Telephone	01452 396792
e-mail	gareth.hooper@gloucester.gov.uk

Report Reference number	LAQM Progress Report 2011
Date	14 th November 2011

Executive Summary

This is the latest in an annual series of reports under the Local Air Quality Management regime of the Environment Act 1995. The previous reports are summarised in section 1.4. All are available online at www.gloucester.gov.uk/pollution by following the “air quality” links. As a result of these reports the city currently has three Air Quality Management Areas (AQMAs) in Priory Road, Barton Street and Painswick Road. Maps are shown at Fig 1.1a –c .
The latest monitoring confirms the need to maintain these AQMAs.

The first version of this report was written in April 2010 using nitrogen dioxide bias factors available at that time. New bias factors were made available via DEFRA in late September 2010. The new factor significantly alters the conclusions drawn in April. This version is rewritten using the data and conclusions drawn in October 2010. The rewriting only affects the conclusions for nitrogen dioxide and the following paragraphs.

The last Updating and Screening Assessment (2010) showed that a detailed assessment is required for fine particles at the housing near Myers Road. This monitoring has been completed and shows that an AQMA does not need to be declared at this location. The results of this are detailed in 2010 Detailed Air Quality Assessment of the Vicinity of Myers Road Gloucester for Gloucester City Council. However, since this monitoring exercise, a building waste recycling facility has begun operating at the site. This process is under consideration as to whether further monitoring is required.

The last Updating and Screening Assessment also showed a need for a detailed assessment for nitrogen dioxide at a location on Barnwood Road, a short length of houses between Elmbridge Road and the Cross Keys public house. This assessment has been carried out and **is included in this report**. It shows that a new Air Quality Management Area is **not** required at this location
The current report does not show the need for any further detailed assessments or for any changes to the existing AQMAs.

Table of contents

1	Introduction	6
1.1	Description of Local Authority Area	6
1.2	Purpose of Progress Report	6
1.3	Air Quality Objectives	6
1.4	Summary of Previous Review and Assessments	8
2	New Monitoring Data	<u>1213</u>
2.1	Summary of Monitoring Undertaken	<u>1213</u>
2.2	Comparison of Monitoring Results with Air Quality Objectives	<u>1817</u>
3	New Local Developments	<u>2420</u>
3.1	Road Traffic Sources	<u>2420</u>
3.2	Other Transport Sources	<u>2420</u>
3.3	Industrial Sources	<u>2420</u>
3.4	Commercial and Domestic Sources	<u>2420</u>
3.5	New Developments with Fugitive or Uncontrolled Sources	<u>2420</u>
4	Local / Regional Air Quality Strategy	<u>2520</u>
5	Planning Applications	<u>2520</u>
6	Air Quality Planning Policies	<u>2820</u>
7	Local Transport Plans and Strategies	<u>2920</u>
8	Climate Change Strategies	<u>3020</u>
9	Implementation of Action Plans	<u>3120</u>
10	Conclusions and Proposed Actions	<u>3220</u>
10.1	Conclusions from New Monitoring Data	<u>3220</u>
10.2	Conclusions relating to New Local Developments	<u>3420</u>
10.3	Other Conclusions	Error! Bookmark not defined.
10.4	Proposed Actions	<u>3420</u>
11	References	<u>3520</u>

Appendices

- Appendix A QA/QC Data
- Appendix B Monthly detailed data

List of Tables

- 1.1 Air quality Objectives included in regulations for Local Air Quality Management
- 2.2 Details of non-automatic monitoring sites
- 2.4 Results for nitrogen dioxide diffusion tubes
- Appendix B Corrected Monthly data; raw monthly data

List of Figures

Fig 1.1 Maps of Air Quality Management areas

- 1.1a Barton Street AQMA
- 1.1b Priory Road AQMA
- 1.1c Painswick Road AQMA

Fig 2.2 Key Map

Fig 2.4 Trends in annual mean nitrogen dioxide

- 2.4a Barnwood Road proposed AQMA
- 2.4b Barton Street AQMA
- 2.4c Priory Road AQMA
- 2.4d Painswick Road AQMA

Fig 2.2.2 Benzene trends

1 Introduction

1.1 Description of Local Authority Area

Gloucester is a small city (population 110,000) on the left bank of the tidal River Severn, backed by the Cotswold escarpment. The prevailing airflow is from the southwest up the river, channelled by the hills in the distance to either side. The M5 motorway edge forms the eastern boundary, and thus airflows are mainly from the city towards the motorway.. The city is unusual in being a compact area surrounded by farmland, which is mostly in neighbouring districts.

A large waste disposal site occupies the northwest part of the city, which benefits from a comprehensive Permit to Operate issued by the Environment Agency. There are several Part A1 industrial processes in the city, mainly due to discharges to sewer, and thus of little concern here. There is one Part A2 installation, an aluminium foundry and smelter. There are 41 installations permitted under Part B, including petrol stations, vehicle refinishers, coating plant, dry cleaners, timber yards, none of which are significant polluters.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceeding an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (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). They are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1. includes the number of permitted exceedences in any given year (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
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 mg/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 Summary of Previous Review and Assessments

All reports post 2003 are available at www.gloucester.gov.uk/pollution following the *Air Quality* link. For simplicity only locations of concern are mentioned below. The actual reports should be examined for other areas studied at various times.

Assessments before 2000 showed that there were no areas of concern in the City. However the Updating and Screening Assessment for 2002 (published May 2003) restudied many areas of the city and showed that there were five areas of potential concern. The Detailed Assessment of these areas published in 2004 confirmed:

Millbrook Road – No further concern for benzene

Priory Road –AQMA required for nitrogen dioxide (declared in Aug 2005)

Barton Street –AQMA required for nitrogen dioxide (declared in 2005)

Eastern Avenue/Painswick Road (North) no current concern for PM10 and nitrogen dioxide

Barnwood Road/ Elmbridge Road junction no current concern for PM10 and nitrogen dioxide – The AQMA was not declared because when the bias factor was taken into account in respect of Diffusion Tube data, the Air Quality Objectives had been met for this area. See page 18

Myers Road – ‘The 2010 Detailed Air Quality Assessment in the vicinity of Myers Road’ stated that ‘This detailed assessment shows that the residential area around Myers Road industrial area including the Armscroft Park area meets the air quality target for England for fine particles (PM10) and that there is no further need to consider the air quality of this area under current legislation.

The Updating and Screening assessment for 2005 (published May 2006) once again showed that a detailed assessment was required for nitrogen dioxide for the short section of Painswick road mentioned above. The detailed assessment (published March 2007) showed that an AQMA was required for this area (declared Oct 2007). This report also required a detailed assessment for nitrogen dioxide for the Barnwood Road junction mentioned above. The detailed assessment published in March 2008 showed that an AQMA was not required at that time.

The Updating and Screening Assessment for 2008 published May 2009 showed that a detailed assessment was again required for nitrogen dioxide for the Barnwood Road/ Elmbridge Road junction. **This current report includes another detailed assessment for this area that shows that an Air Quality Management Area is still not required.**

The Updating and Screening Assessment published May 2009 also showed that a detailed assessment should be made for fine particles (PM₁₀) for the receptor sites within 200m of Myers Road, due to the potential for re-suspended dust from a haul road used by heavy goods vehicles and dust from activities including a Cement Batcher, Aggregates Recycling Site and a Coal Merchant. .This monitoring has been

completed and was reported in 'The 2010 Detailed Air Quality Assessment in the vicinity of Myers Road' and concluded that there was no need to declare an AQMA at the time in this location.

The Benzene, Toluene and Xylene (BTX) tube monitoring was ceased in December 2010 as levels had been falling since 1998 and were significantly below the $5.00\mu\text{g m}^{-3}$ objective. Monitoring would recommence in the event of a significant change in circumstances leading to predictions in a rise in BTX.

Figure 1.1 Map of AQMA Boundaries

Maps are provided for the three existing AQMAs. The key map Fig 2.2 shows their positions within the city, and the approximate position of NOx tube sampling points across the city.

Fig 1.1a Barton Street AQMA

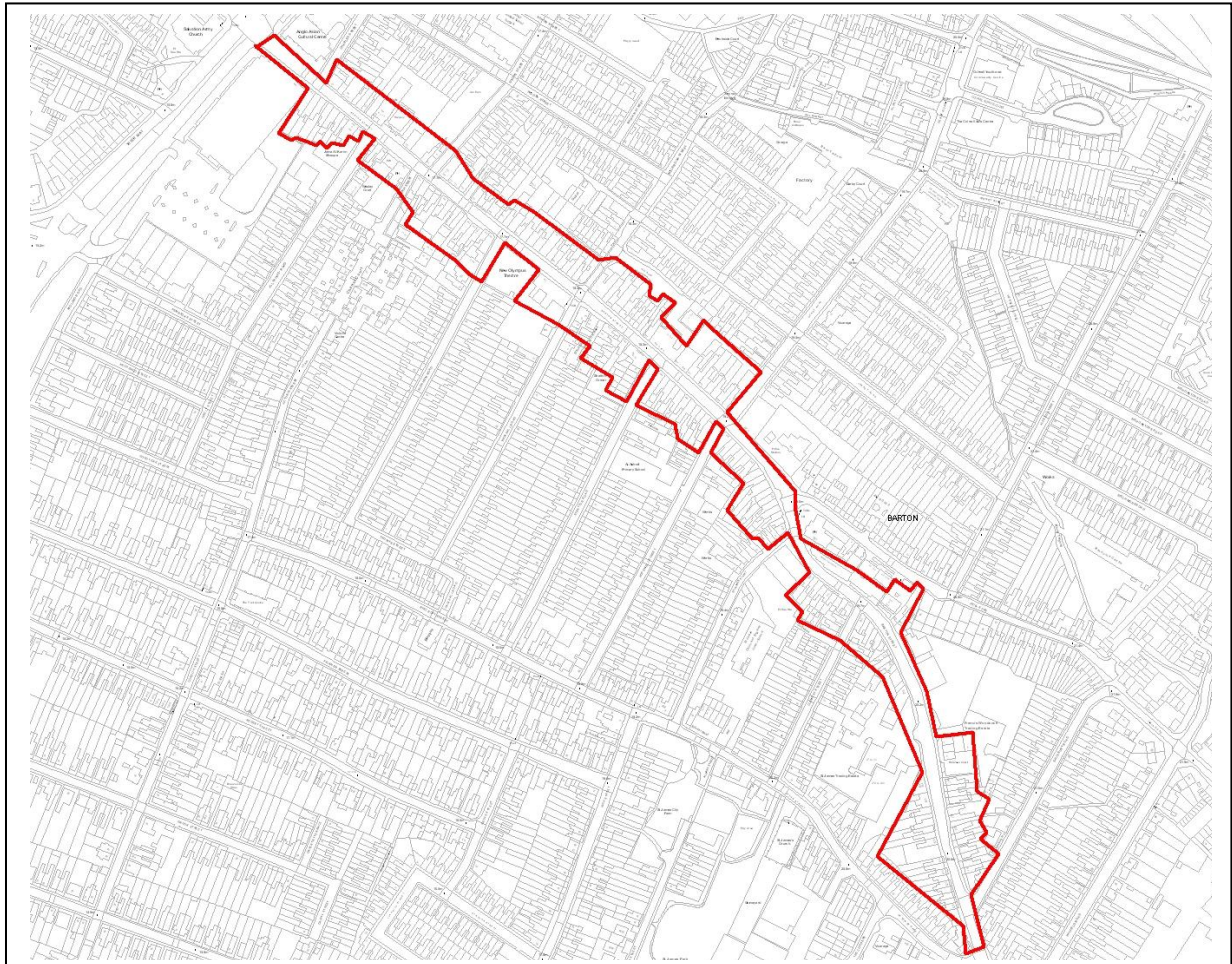


Fig 1.1b Priory Road AQMA

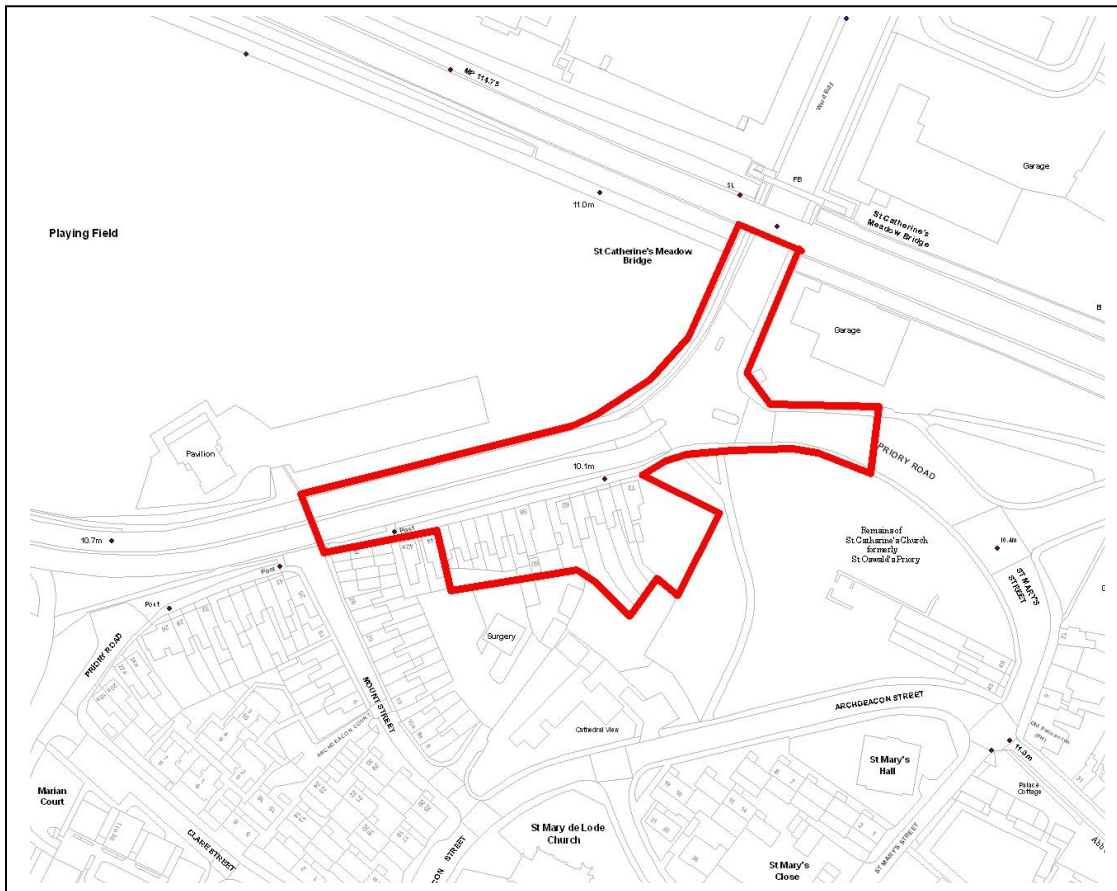


Fig 1.1c Painswick Road



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

An automatic monitoring site was in use during the period of this report. The County Council has installed a nitrogen dioxide chemiluminescence station at the City end of Barton Street adjacent to the inner ring road. The monitor has been operating since 1st April 2010. Since April 2011 the Site has been operated by Gloucester City Council. The monitor is a Teledyne chemiluminescence Nitrogen Oxides Analyser. A summary results of the automatic monitoring are presented in Table 2.2.



Figure 2.1 Teledyne chemiluminescence Nitrogen Oxides Analyser in Barton Street

2.1.2 Non-Automatic Monitoring

A map of the city showing the approximate positions of NO_x tube sampling points is given in figure 2.2. A table of the sampling point details is given below in Table 2.2. Information about quality assurance of the results is given in Appendix 1 and detailed monthly results are given in tables in Appendix 2. Annual average results are given in table 2.4, showing the last three years. Trend graphs for several years where more data is available are given in Fig 2.4 The results are discussed in section 10.1

Air Quality Statistics

Pollutant	NO ₂	NO _x
Number Very High	0	-
Number High	0	-
Number Moderate	0	-
Number Low	6331	-
Maximum 15-minute mean	287 µg m ⁻³	1142 µg m ⁻³
Maximum hourly mean	145 µg m ⁻³	965 µg m ⁻³
Maximum running 8-hour mean	121 µg m ⁻³	593 µg m ⁻³
Maximum running 24-hour mean	98 µg m ⁻³	421 µg m ⁻³
Maximum daily mean	92 µg m ⁻³	411 µg m ⁻³
Average	46 µg m ⁻³	124 µg m ⁻³
Data capture	72.3 %	72.3 %

All mass units are at 20°C and 1013mb
 NO_x mass units are NO_x as NO₂ µg m⁻³

Table 2.2 A summary of the ratified 2012 data for the Automatic Monitoring site in the Barton Street AQMA. Source: AQDM Ltd.

The data shows that the objective for the annual mean of Nitrogen Dioxide has been exceeded in the year January – December 2010. This confirms that the AQMA should remain in place and actions to reduce the annual mean concentration are required.

Hourly Mean Timeseries

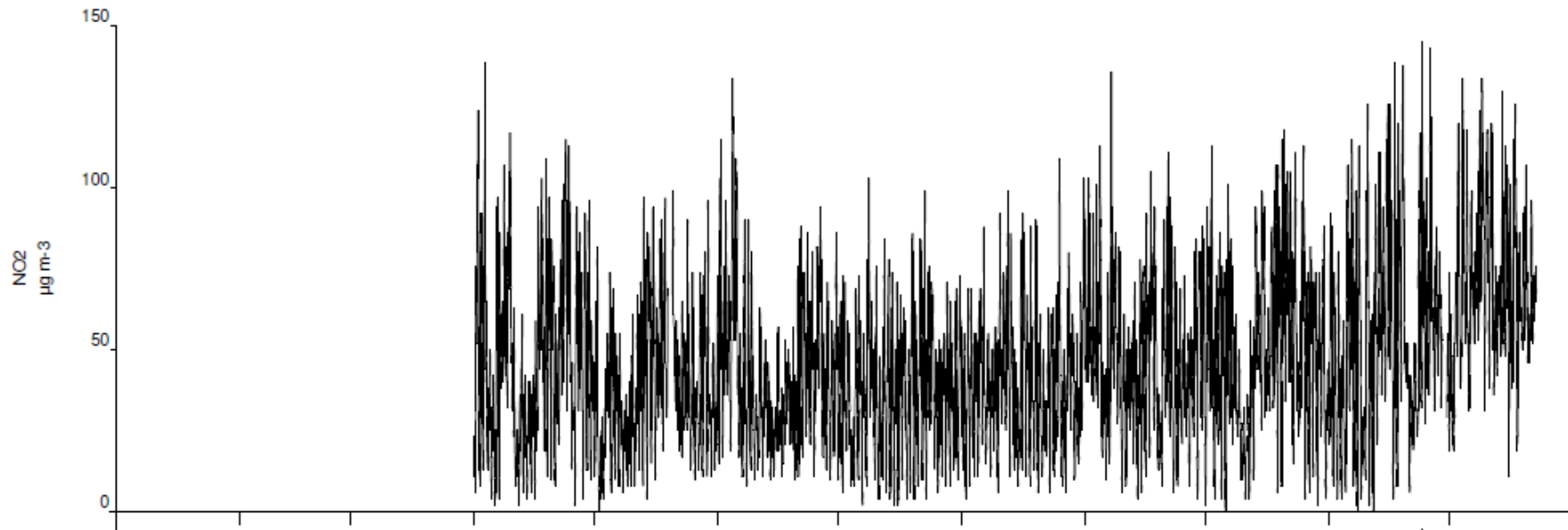
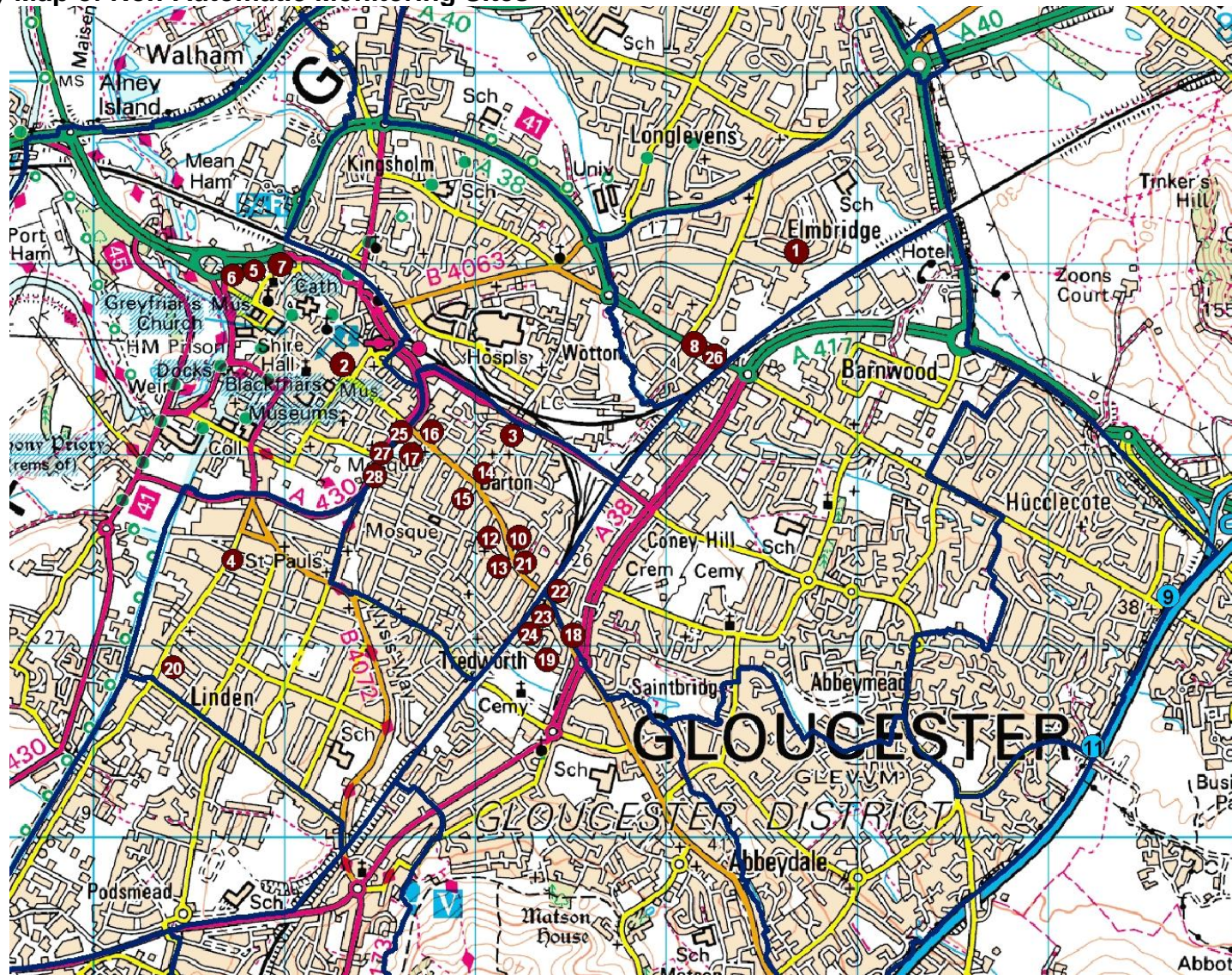


Figure 2.2. Hourly timeseries data, by month, of Nitrogen Dioxide concentrations in the Barton Street AQMA from January to December 2010. Source: ADQM Ltd

Figure 2.3 Key Map of Non-Automatic Monitoring Sites



B = Priory Rd AQMA C = Barton St AQMA; D = Painswick Road AQMA

(See individual maps for actual extent of each AQMA)

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	ID	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road	Worst-case Location?
Elmbridge Junior School	1	Urban background	X 385430 Y 218870	Benzene, NO ₂	N	Y 1m	NA	N
Guildhall	2	Urban background	X 383243 Y 218489	Benzene, NO ₂	N	N	NA	N
79 Millbrook Street	3	Roadside	X 384190 Y 218160	Benzene, NO ₂	N	Y <1M	1	Y
59 Bristol Rd (façade)	4	Background	X 382690 Y 217440	NO ₂	N	Y 1m		Y
56 Priory Road	5	Roadside	X 382921 Y 219034	NO ₂	Y	Y <1m	5	Y
46 Priory Road	6	Roadside	X 382898 Y 219029	NO ₂	Y	Y <1m	5	Y
66 Priory Road	7	Roadside	X 382950 Y 219040	NO ₂	Y	Y <1m	6	Y
53 Barnwood Road	8	Roadside	X 385113 Y 218595	NO ₂	N	Y <1m	1.5	Y
35 Buscombe Gardens	9	Background	X 387670 Y 217250	NO ₂	N	Y <1m	NA	N
Opp 248 Barton St	10	Roadside	X 384090 Y 217731	NO ₂	Y	Y <1m	2.5	Y
12 Caravan Green Lane	11	Background	X 387250 Y 216530	NO ₂	N	Y <1m	NA	N
246 Barton Street	12	Roadside	X 384081 Y 217725	NO ₂	Y	Y <1m	1.5	Y
316 Barton street	13	Roadside	X 384175 Y 217501	NO ₂	Y	Y <1m	2.4	Y
219A Barton St	14	Roadside	X 384000 Y 217863	NO ₂	Y	Y 1M	1.7	Y
196 Barton Street	15	Roadside	X 383989 Y 217857	NO ₂	Y	Y 1m	2	Y
99 Barton Street	16	Roadside	X 383717 Y 218094	NO ₂	Y	Y 1m	1.4	Y
124 Barton Street	17	Roadside	X 383726 Y 218074	NO ₂	Y	Y 1m	1.5	Y

97 Painswick Road	18	Roadside	X 384558 Y 216946	NO ₂	Y	Y 1M	5.1	Y
106 Painswick Road	19	Roadside	X 384550 Y 216932	NO ₂	Y	Y 1m	3.5	Y
157 Bristol Rd	20	Roadside	X 382410 Y 217013	NO ₂	N	Y 1m	6.5	Y
301 Barton St	21	Roadside	X 384182 Y 217533	NO ₂	Y	Y 1m	4.8	Y
65 Painswick Rd	22	Roadside	X 384512 Y 217023	NO ₂	N	Y 1m	5.4	Y
76 Painswick	23	Roadside	X 384490 Y 217027	NO ₂	N	Y 1m	3.7	Y
88 Painswick Road	24	Roadside	X 384509 Y 216998	NO ₂	Y	Y 1m	3.8	Y
Barton Street	25	Background	X 383717 Y 218094	NO ₂	Y	Y 1m	2	N
Barton Street	27	Roadside	X 383717 Y 218094	NO ₂	N	N	2	Y
Barton Street	28	Roadside	X 383717 Y 218094	NO ₂	Y	N	2	Y
61 Barnwood Road	26	Roadside	X 385130 Y 218585	NO ₂	N	Y 1m	4.6	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Charts are presented for the four areas of concern separately. All have the two local background site (Guildhall and Elmbridge) results for comparison. Note 40ug/m3 nitrogen dioxide represents the annual target that should not be exceeded. Results over 60 ug/m3 represent a risk of exceeding the 1 hour standard. No levels over 60 ug/m3 were recorded except at the roadside locations under the St Catherine’s Railway Bridge, where there are no relevant receptors. The tabular data is then presented in Table 2.2. Detailed monthly data is presented in the appendices. The results are discussed at 10.1

Figures 2.5a-d. Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.

Fig 2.5a-4a Barnwood Road

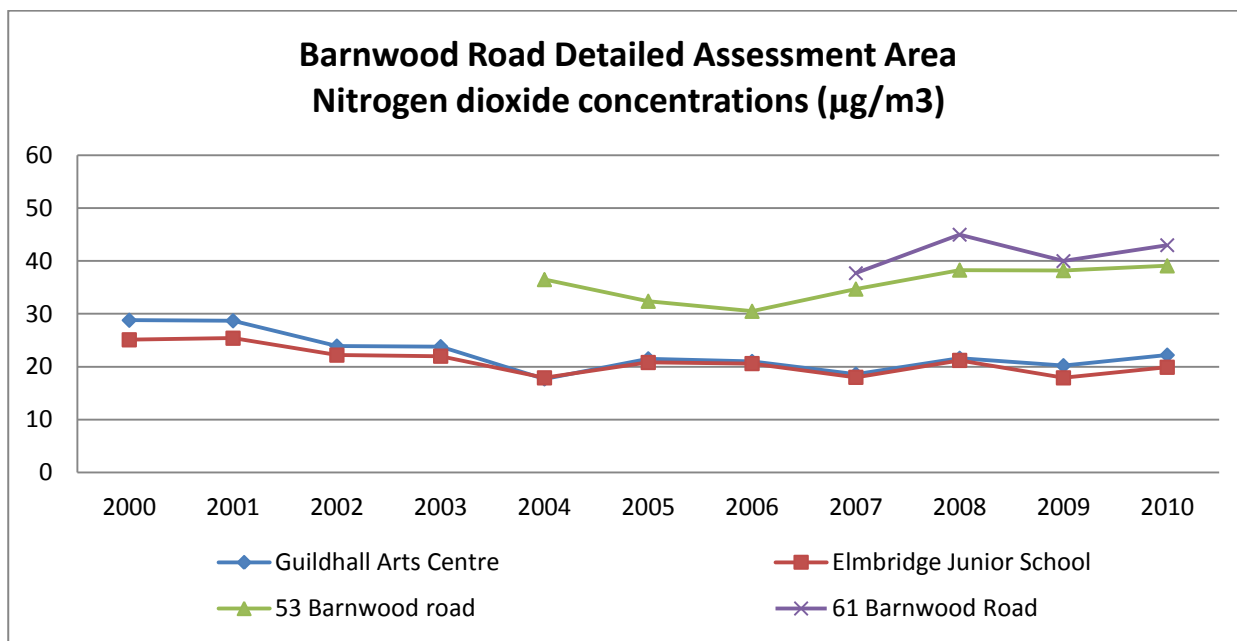


Fig 2.5b-4b Barton Street AQMA

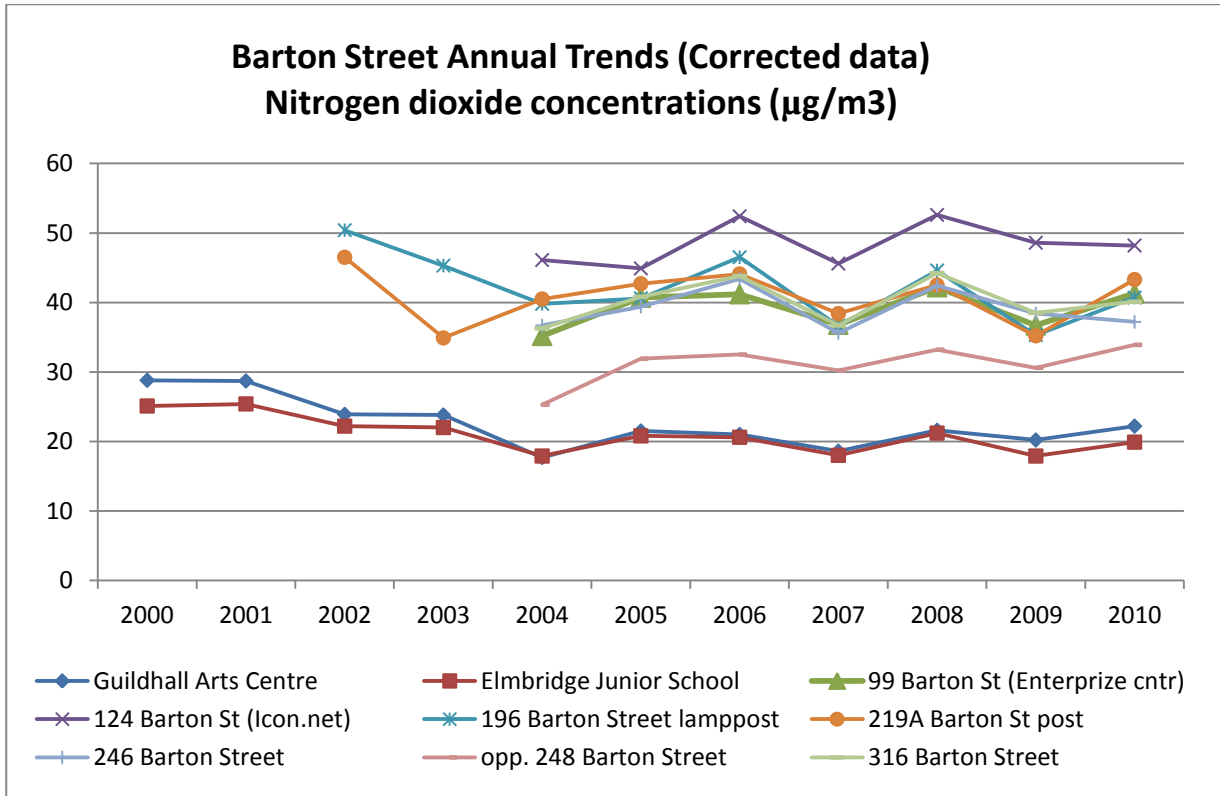


Fig 2.5c-4c Priory Road AQMA

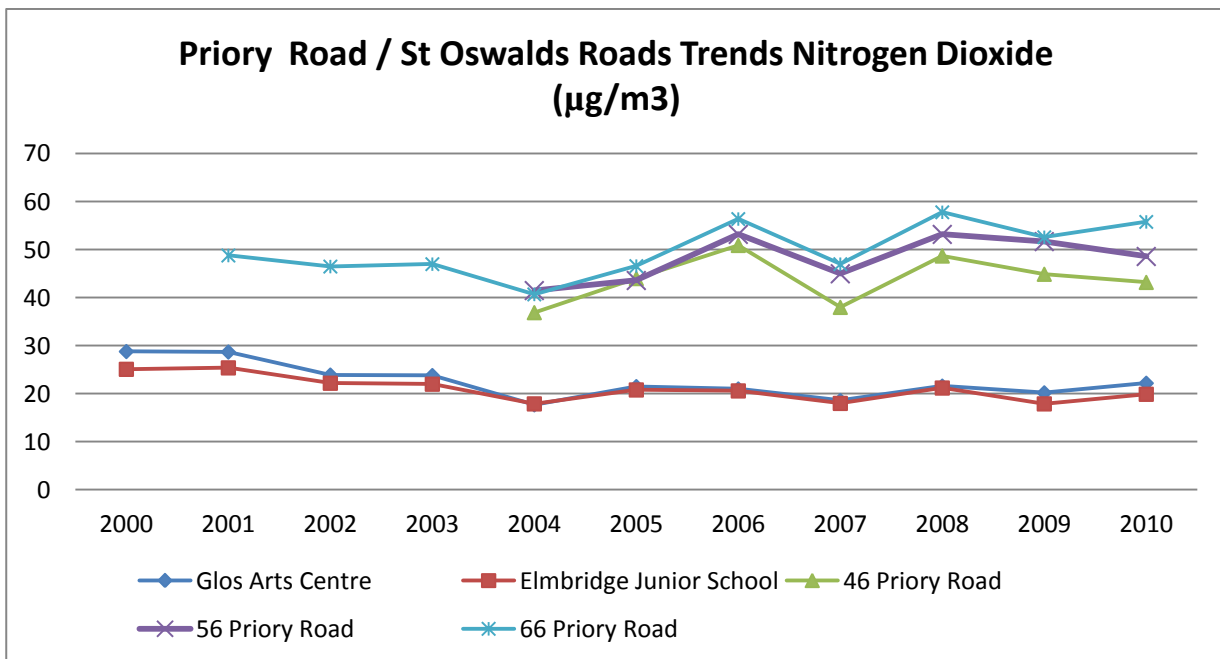


Fig 2.5d-4d Painswick Road AQMA

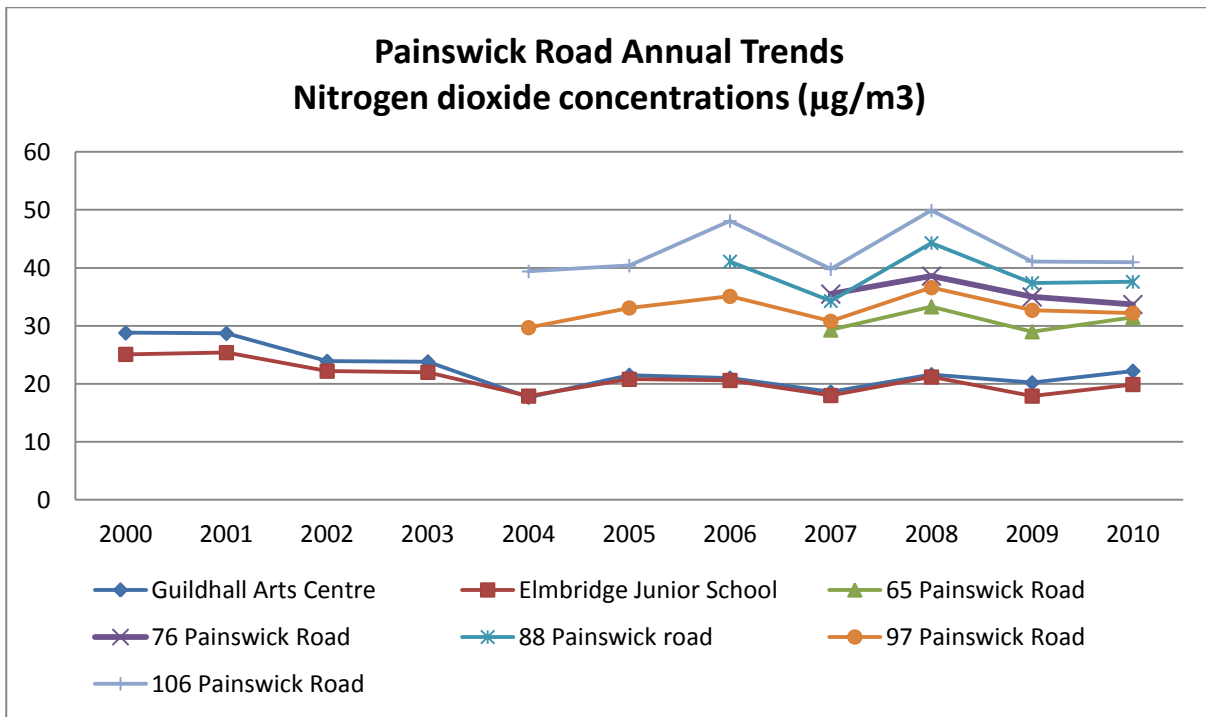


Table 2.6-3 Results of Nitrogen Dioxide Diffusion Tubes

Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
				2008 ^{c,d}	2009 ^c	2010
Elmbridge JS	N	92	100	21.2	19.1	19.9
Guildhall	N	92	100	21.6	21.5	22.2
79 Millbrook st	N	100	100	36	35	32.4
59 Bristol Rd	N	100	100	34.3	31.5	30
56 Priory Road	Y	100	100	53.2	55	48.6
46 Priory Rd	Y	100	100	48.7	47.7	43.2
66 Priory Road	Y	100	100	57.8	56	55.8
53 Barnwood rd	N	92	92	38.3	40.6	39.1
35 Buscombe Gdns	N	100	100	33.7	31.4	29.9
Opp. 248 Barton	Y	100	100	33.2	32.6	33.9
Orchard Park	N	100	100	28.1	26.1	26
246 Barton St	Y	100	100	42.4	40.8	37.2
316 Barton St	Y	100	100	44.2	40.9	40.1
219A Barton St	Y	100	100	42.5	37.4	43.3
196 Barton St	Y	100	100	44.6	37.5	40.7
99 Barton St	Y	100	100	42.2	39.1	41.3
124 Barton St	Y	100	100	52.6	51.6	48.2
97 Painswick rd	Y	92	92	36.6	34.8	32.2
106 Painswick Rd	Y	100	100	49.9	43.7	41
157 Bristol road	N	100	100	31.5	29.5	27.9
301 Barton st	Y	100	100	28.3	29.7	27.1
65 Painswick rd	N	100	100	33.3	30.8	31.5
76 Painwick rd	N	100	100	38.6	37.2	33.7
88 Painswick rd	Y	100	100	44.3	39.8	37.6
Barton Street	Y	N/A	N/A	N/A	N/A	N/A
61 Barnwood RD	N	92	92	45	42.5	43
Barton Street	Y	N/A	N/A	N/A	N/A	N/A
Barton Street	Y	N/A	N/A	N/A	N/A	N/A

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

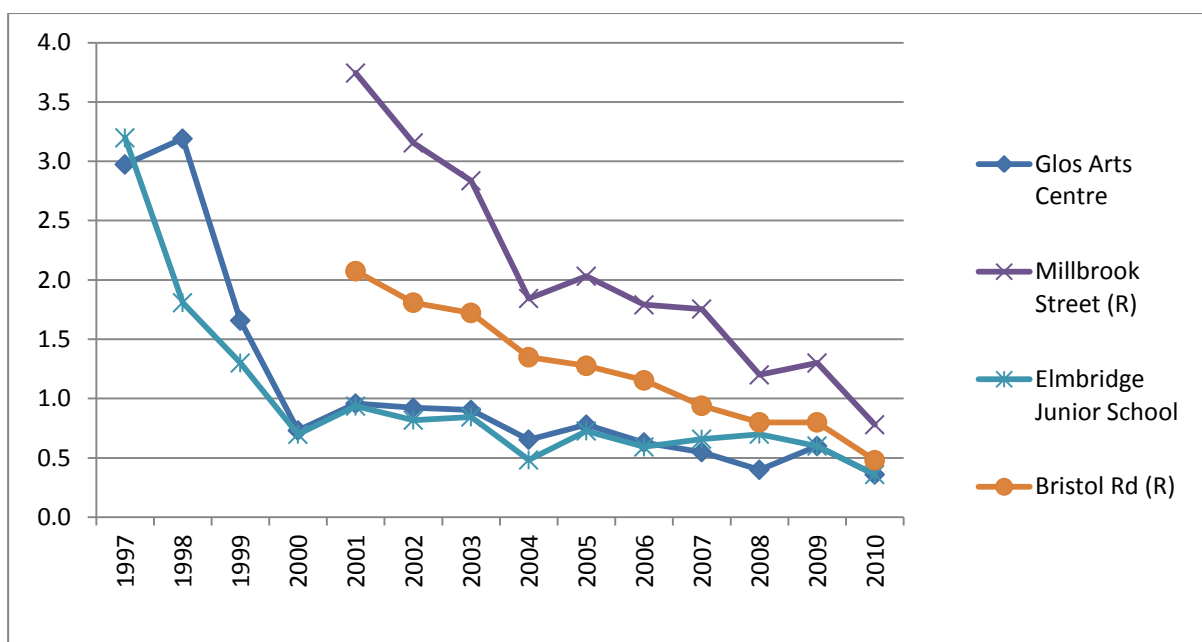
* These results not annualised as they are illustrative rather than useful.

2.2.2 Benzene

Monthly data for benzene is given in Appendix B. No concentrations had been approaching levels of concern. Benzene monitoring ceased in December 2010 because of the consistent downward trend since monitoring begun, to significantly below the objective of 5.00 µg/m³.

A trend graph is shown in Figure 2.5.

Figure 2.76. Annual Benzene concentrations (µg/m³) at locations across Gloucester 1997 - 2010



2.2.3 Summary of Compliance with AQS Objectives

Gloucester City Council has examined the results from monitoring in the City. Concentrations of pollutants outside of the AQMAs are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

In the paragraphs below, relevance is described in the guidance manual. This does not imply that new developments have not taken place in 2009.

3.1 Road Traffic Sources

None relevant

3.2 Other Transport Sources

None Relevant

3.3 Industrial Sources

Gloucester City shares its southern boundary with Stroud District Council. Javelin Park is an industrial estate that lies within Stroud but sits right on this boundary. It has been announced that this will be the site for The Gloucestershire Waste Facility and there are early indications that this might include both waste to energy and composting. A screening opinion has recently been requested by the County Council in respect of this development and air quality will be taken into account.

3.4 Commercial and Domestic Sources

Barclays Bank power generation – Holds a Pollution Permit from the Environment Agency. The Permit limits emissions to air so as not to adversely affect air quality.

Railway Triangle – A commercial development with a supermarket and light industrial and commercial use. An Air Quality Report has been submitted by the applicant and indicates that there is no significant effect on air quality either during the construction or phase or the end-use of the development.

Gardener Denver Site, Barton Street – an Air Quality report is being produced on behalf of the applicant.

Tesco, St Oswalds – an Air Quality report has been produced on behalf of the applicant and indicates that the development will have a slight negative impact on levels of NO_x at receptors points within The Priory Road AQMA.

3.5 New Developments with Fugitive or Uncontrolled Sources

None relevant

Gloucester City council confirms that there are several newly identified local developments which may have an impact on air quality within the Local Authority area.

4 Local / Regional Air Quality Strategy

The county of Gloucestershire constitutes six local authorities, some of which have identified locations where pollutant concentrations may exceed national targets in future. Traffic emissions are primarily responsible for the elevated concentrations at such pollution ‘hot spots’, and reductions in traffic emissions will be necessary to improve local air quality across the Gloucestershire area.

For those local authorities requiring the development of air quality action plans both now and in future, the assistance and collaboration of a variety of stakeholders, agencies and others is necessary. Of particular importance is the assistance of transport planning and land-use planning functions within local authorities and the County Council in providing the means to improve air quality.

Whilst communication and collaboration are essential in working towards the improvement of air quality *within* local authorities, collaborative efforts *across* the county are essential for long-term air quality improvements. The South West Regional Development Agency (due to close in March 2012) offer opportunities for ensuring air quality is considered at a regional level with respect to regional transport and land-use planning. The Highways Agency and Environment Agency, business and commerce across the region and members of the public are important stakeholders that form the partnership approach to improving air quality across the area. Air Quality is being raised on the Public Health and Health and Wee Being Agendas.

The six local authorities of Gloucestershire work actively work together, to seek air quality improvements, through the Gloucestershire Pollution Group (GPG). Within GPG a Technical Group dedicated to Air Quality has been formed, Gloucestershire Air Group (GAG). It has the remit of information and knowledge sharing across the county and will feed into the County Air Quality Document. Future funding mechanisms, for the routine requirements of local air quality management and for the implementation of initiatives, will be best achieved through a collaborative Pollution Group approach. Future proposed revisions of the national Air Quality Strategy, national air quality objectives and the introduction of newly regulated pollutants are best addressed through the work of this Group. Where a proposed development has the potential to negatively impact on air quality, it is routine to request the applicant carries out an Air Quality Assessment. Where an assessment demonstrates the proposed development will have an impact, Gloucester City Council will seek funding from the applicant to monitor and / or remedy the problem through s.106 of the Town and Country Planning Act 1990.

The development of a County-wide Air Quality Strategy for Gloucestershire provides an important framework for maintaining good air quality and improving upon poor air quality over the years ahead. As the pressures of large-scale developments, housing growth and road-building increases, so too the need for maintaining the quality of the environment and the health and well-being of the public and communities served by the six local authorities of Gloucestershire. Community planning and sustainability planning processes underway within the local authorities and the County will need to take account of local air quality, for the benefit of communities now and in future

April 2011

Gloucester City Council - England

across the Gloucestershire. The need to address climate change will also require integration with plans to improve air quality locally across the County.

The AQS was drawn up in 2004 by UWE on behalf of the GPG and is currently undergoing revision within and by the GPG. The current strategy and its future replacement will be found at www.gloucester.gov.uk/pollution, following the *air quality* link.

5 Planning Applications

No planning applications that have a likely material effect on air quality in the city have been approved this year. There is close liaison between Environmental Health and Planning departments to ensure potential air quality issues are discussed at an early stage.

Current issues not yet reaching the formal planning stage are:

Barclays Bank Bio-Mass boiler. An Application for a Data Centre Combustion Facility was received by the Environment Agency (Ref: EA/EPR/CP3635KA/A001) for an Installation 'Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.' The application included occasional breaches of Air Quality targets and the Environment Agency rejected these breaches.

Proposed development near Metz Way, Gloucester at an area known locally as the 'Railway Triangle.' The site is currently applying for Full Planning Permission. The proposed development is commercial and retail, and no residential accommodation. Air Quality is a material concern both locally and the effect increased traffic may have on the wider transport network in Gloucester and what impact on air quality this may have. A consultant has been instructed to model the air quality at agreed locations around Metz Way. This data will be used in agreeing any mitigation through the planning process.

Gloucestershire County Council Waste Incinerator. Gloucestershire County Council has unveiled plans to site a regional waste facility at a location on our boundary with Stroud District Council. .

6 Air Quality Planning Policies

The City currently has no formal policy specifically dealing on its own with air quality, although policies imply that air quality is a material fact.

s.106 Agreements are being used to finance Air Quality Monitoring and / or remedies where developments may significantly affect air quality.

Work is currently underway to write a countywide Air Quality and Planning Guidance document to ensure a systematic approach to air quality policies across Gloucestershire.

Current planning policy documents can be found at <http://glcstrplnng12.co.uk/online-applications/>

Comment on planning policy is welcome at pdg@gloucester.gov.uk

7 Local Transport Plans and Strategies

The local transport plan is a County Council plan, which may be found at www.gloucestershire.gov.uk/ltp2. This plan is currently being revised, and takes account of the various Air Quality Management Areas in the County. The draft Action Plan for our current three AQMAs was taken into account during the formation of the plan. The county council devised most of the proposed Actions in the plan, as they involve traffic, the main cause of the problem. It has not been possible to discuss the improvement to the LTP and Action Plan with County officers in the timescale for submitting this document. The County is aware of the need to create a further AQMA, which will be considered as the LTP is revised.

8 Climate Change Strategies

The City Council has adopted a climate change strategy, which may be found at

<http://www.gloucester.gov.uk/Documents/councilservices/Planning/ClimateChange/ClimateChangeStrategy2009.pdf>

It covers the period July 2008- July 2010 and is thus due for review this year. Climate change strategy falls within the Regeneration Directorate of the City Council. Comment on the strategy is welcome at cdc@gloucester.gov.uk

The current objectives of the strategy are:

To increase public awareness of Climate Change, and of what people and the organisations they represent can do to lessen their impacts upon the climate and how they can adapt to a changed climate.

To maximize the reduction in greenhouse gas emissions over the strategy period and where possible exceed government and regional targets.

To increase the amount of electricity that is generated in Gloucester from low carbon or renewable sources to a minimum of 11% by 2010 in line with Regional Planning Guidance for the South West.

To enable Gloucester, its citizens and biodiversity to adapt to the changes brought about by climate change to ensure the maintenance of a high quality of life.

To reduce emissions from the City Council estate by 10% in the year 2010 and as such sign up to the 2010 campaign.

Formerly reported through National Indicator 185, a standardised method of measuring the output of carbon dioxide by local authority's own activities, it will be possible to see if strategies are working within a few years. The method is not easy to follow as not all the data is routinely collected by all authorities. Information is still collected and reported via the Department of Energy and Climate Change (DECC).

9 Implementation of Action Plans

The Action Plan progress report will be submitted separately.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

The monitoring data shown in Chapter 2 is discussed here. Detailed monthly data is given in the Appendices.

Benzene

Benzene monitoring ceased in December 2010. However, monitoring may recommence in the event of any significant changes which would adversely impact the concentrations of benzene

Nitrogen dioxide – outside AQMAs

Firstly discussing the areas outside the AQMAs and possible AQMAs, we note that the two sites (Guildhall and Elmbridge Junior school) used as urban background continue to give concentrations in the same order as that calculated nationally for the relevant grid squares. These results are shown for comparison on the various trend graphs.

The Millbrook Street site is the nearest house to the level crossing, with a vehicular fly-over intervening. The nitrogen dioxide levels have dropped in the past two years from 36ug/m³ to about 32.4ug/m³. This site needs to be kept under review. Actions to curb through traffic on Barton street may have the effect of increasing traffic at this point.

The Bristol Road lamp post site now gives 30ug/m³. 157 Bristol Road is also a receptor site and this remains comfortably lower 27.9ug/m³, as the traffic on Bristol road has declined with the bypass completion (Secunda Way).

The two sites chosen as the nearest properties to the M5 motorway continue to give comfortably low concentrations.

Nitrogen dioxide –Priory road AQMA

Two new monitoring sites were briefly used at the beginning of 2010, one at the roadside by the Wessex Garage on St Oswalds Road, just outside the AQMA and one roadside by the first vehicle in the traffic light queue. Fig 2.4c shows that concentrations of nitrogen dioxide at the receptors are still fluctuating, with two of the sites dropping and one rising. The AQMA must remain in force.

Nitrogen dioxide – Barton Street AQMA

While several locations in this AQMA remain below the target level of 40ug/m³, it is sensible to maintain the area of the AQMA. The higher concentrations are all on the west side of the street. The sample at the rear of the street (End Vauxhall Terrace) shows that the concentrations behind properties remain low, thus justifying our advice to ventilate Barton Street properties from the rear whenever a planning application arises. Trend graph Fig 2.4b shows that in general concentrations may have stopped rising. The chemiluminescence analyser that was installed by the county council just outside the canyon at its narrowest, is now owned and operated by Gloucester City Council. This has shown very few instances where the hourly target is briefly breached, and the long term average is likely to be low, considering the sampler is within 20m of the site with the highest annual average.

Nitrogen Dioxide – Painswick Road AQMA

The trend graph Fig. 2.4d shows that nitrogen dioxide concentrations may be declining, but several year's monitoring will be needed before considering any revocation of the AQMA. The sites at 65 and 76 Painswick road are monitored to ensure that the affected area is not increasing in size.

Nitrogen Dioxide –Barnwood Road

The area where there is a group of dwellings close to the kerb on Barnwood road has been of concern over several years. The only location where there is a terrace of 7 dwellings close enough to the kerb is between Elmbridge road and the Cross Keys public house. There are isolated dwellings close to the kerb on the section of Barnwood road to the south of the ring road, but traffic levels are much lower there, so there is no need to monitor at such locations.

The trend graph at Fig.2.4a shows that nitrogen dioxide levels have risen steadily over several years. This year 1 diffusion tube had an annual average nitrogen dioxide concentrations above 40ug/m³ and the other marginally below (39.1ug/m³). While it is normal to put continuous monitors at sites for detailed assessment, this was not possible due to the very small gardens and comparatively narrow pavement. The area involved is so small that it was also impractical to put more diffusion tubes in the area. The dwellings on either side of this terrace are set well back from the road. The dwellings on the opposite side of the road are also set back. Previous monitoring has taken place [2002] on the opposite side of the road, which confirmed that concentrations of nitrogen dioxide were unlikely to be of concern. The County has installed traffic counting devices in the vicinity.

Barnwood Road remains a significant location for air quality. Factors which could affect the air quality are monitored.

10.2 Conclusions relating to New Local Developments

Applications for development within the City of Gloucester are scrutinised for potential impacts on air quality both at the Pre-Application stage and Post-Applications stage by Planning Officers. Where impacts are likely or probable, Environmental protection will comment or ask for further information as necessary.

10.3 Proposed Actions

A review of all current data, information and monitoring shows that no further detailed assessments are currently required. No changes are proposed in any of the existing AQMAs.

11 References

Air Quality Assessment Stages 2 & 3 (Dec 2000)

Updating and Screening Assessment for 2002 (May 2003)

All items below are accessible online through www.gloucester.gov.uk/pollution

An Air Quality Strategy for Gloucestershire (UWE 2004)

Detailed Assessment for 5 areas in the City (Dec 2004)

Progress Report for 2004 (May 2005)

Barton Street Air Quality Management Order (Aug 2005)

Priory Road Air Quality Management Order (Aug 2005)

Updating and Screening Assessment 2005 (May 2006)

Gloucestershire CC Local Transport Plan 2006-11

Progress Report for 2006 (April 2007)

Detailed Assessment for Painswick Road (2007)

Painswick Road Air Quality Management Order (Oct 2007)

Progress Report for 2007 (April 2008)

Draft Action Plan for Air Quality Management Areas (July 2008)

Gloucester City Council Climate Change Strategy 2008-10

Updating and Screening Assessment for 2008 (April 2009)

Bristol Scientific Services WASP results (private communication)

UWE R&A website

Appendices

Appendix A: QA/QC Data

Benzene and nitrogen dioxide tubes were supplied and analysed by Bristol Scientific Services, who assure us that the National laboratory guidance for nitrogen dioxide tubes has been followed during the year in question. The WASP results are pictured below. The bias adjustment factor is taken from the R&A website March 2010 spreadsheet., giving 0.77. No co-location tubes were used. It has been found difficult to obtain a vandal-proof sampling method at the Barton Street site at an affordable cost. This has not been pursued.

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	07/01/2009	04/02/2009	139.1	140.6	140.3	140	0.8	1	2.0
2	04/02/2009	04/03/2009	114.4	103.3	95.1	104	9.7	9	24.1
3	04/03/2009	31/03/2009	113.7	119.3	117.8	117	2.9	2	7.2
4	31/03/2009	29/04/2009	118.6	115.4	115.6	117	1.8	2	4.5
5	29/04/2009	03/06/2009	128.2	128.1	127.4	128	0.4	0	1.1
6	03/06/2009	01/07/2009	118.7	113.4	127.2	120	7.0	6	17.3
7	01/07/2009	29/07/2009							
8	29/07/2009	02/09/2009	124.6	122.6	140.0	129	9.5	7	23.7
9	02/09/2009	30/09/2009	103.4	108.4	110.8	108	3.8	4	9.4
10	07/10/2009	04/11/2009	132.2	133.7	131.0	132	1.4	1	3.4
11	04/11/2009	02/12/2009	160.9	157.5	159.1	159	1.7	1	4.2
12	02/12/2009	07/01/2010	126.1	121.4	133.4	127	6.0	5	15.0
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
114	99.1	Good	Good
97	98.1	Good	Good
112	99.4	Good	Good
103	99.4	Good	Good
107	99.5	Good	Good
100	99.6	Good	Good
117	99.6		Good
115	99.2	Good	Good
84	95.1	Good	Good
112	99.3	Good	Good
126	99.6	Good	Good
103	99.5	Good	Good

Overall survey --> **Good precision** **Good Overall DC**
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Bristol - Intercomp 2009	Precision 11 out of 11 periods have a CV smaller than 20%
--	--

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%

Bias calculated using 11 periods of data
Bias factor A 0.85 (0.81 - 0.89)
Bias B 18% (13% - 23%)

Diffusion Tubes Mean: 125 μgm^{-3}
Mean CV (Precision): 3
Automatic Mean: 107 μgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 107 (102 - 112) μgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA

Bias calculated using 11 periods of data
Bias factor A 0.85 (0.81 - 0.89)
Bias B 18% (13% - 23%)

Diffusion Tubes Mean: 125 μgm^{-3}
Mean CV (Precision): 3
Automatic Mean: 107 μgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 107 (102 - 112) μgm^{-3}

Jaume Targa
jaume.targa@aeat.co.uk
Version 03 - November 2006

Appendix B Monthly sampling data

Raw Monthly Nitrogen Dioxide Data

2010 Nitrogen Dioxide raw monthly data													
All values microgrammes per cubic metre													
	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Avg.
Location													
Sites previously in national monitoring programme													
Glos Guildhall	36.0	33.8	26.3	26.8	20.7	20.9	14.6		26.2	29.4	41.3	41.8	28.9
Elmbridge Junior School	30.3	34.4	26.5	21.0	15.9	18.3			22.7	25.9	35.0	28.1	25.8
79 Millbrook Street	53.9	47.2	43.3	43.1	39.9	39.2	27.9	36.4	40.3	41.8	49.3	42.2	42.0
61 Bristol Rd post	62.9	57.0	50.4	42.2	42.4	41.8	31.2	32.6	Disc				45.1
Bristol Road sites													
59 Bristol Road facade	40.8	47.5	41.2	36.7	32.0	35.3	26.3	27.4	34.9	38.6	44.5	49.9	37.9
157 Bristol Road	45.5	43.6	38.8	34.4	29.0	29.6	22.3	26.0	32.5	35.7	43.1	43.1	35.3
Sites near M5 Motorway													
35 Buscombe Gardens	46.8	48.2	42.5	37.5	35.4	35.4	27.8	25.7	39.4	41.4	42.5	43.7	38.9
12 Orchard Park Green Lane	41.7	40.2	40.1	32.7	27.3	31.9	20.4	20.3	30.5	33.3	42.5	43.6	33.7
Priory Road AQMA Area													
46 Priory Road	70.5	66.3	62.4	59.5	57.9	36.6	45.0	43.9	57.6	53.6	68.3	52.2	56.1
56 Priory Road	71.7	72.5	56.6	65.6	65.9	73.6	56.6	51.4	62.1	53.6	62.3	66.2	63.2
66 Priory Road	79.3	82.4	70.1	70.8	75.9	68.9	55.2	72.5	73.7	66.9	73.8	79.6	72.4
Rear 58 Priory Road	51.6	51.4	39.2	37.3	36.2	37.5	19.8	29.1	Disc				37.8
Barton Street AQMA Area													
99 Barton St (Enterprize cntr)	66.4	62.8	49.9	50.2	50.9	52.6	38.8	39.3	56.8	60.9	54.1	61.6	53.7
124 Barton St (Icon.net)	73.1	67.6	63.2	61.5	56.9	52.3	54.7	57.7	73.8	58.1	69.4	62.7	62.6
196 Barton Street lamppost	62.0	57.4	50.7	52.0	48.0	49.3	48.1	42.6	54.7	51.0	56.6	62.1	52.9
219A Barton St post	65.6	65.0	50.7	52.0	54.8	56.4	34.7	44.9	61.9	54.4	63.6	71.4	56.3
End Vauxhall Terrace	41.0	37.7	28.8	26.0	21.5	23.3	20.4	20.8	Disc				27.4
246 Barton Street	63.1	48.2	48.4	43.6	39.3	44.4	38.5	39.1	48.3	52.1	58.1	56.9	48.3
opp. 248 Barton Street	55.5	50.7	44.4	39.3	43.0	42.5	26.2	32.4	41.3	41.5	55.1	56.6	44.0
316 Barton Street	58.8	56.3	53.5	47.1	45.0	50.0	38.4	45.9	54.8	53.0	57.1	65.0	52.1
301 Barton street	47.7	42.4	38.0	31.2	30.2	32.1	20.5	24.2	31.6	34.4	42.2	47.2	35.1
Painswick Road AQMA Area													
65 Painswick Road	53.8	48.1	41.2	30.8	34.4	37.4	24.7	27.5	37.5	39.2	54.1	62.1	40.9
76 Painswick Road	49.0	51.2	47.5	35.5	36.9	39.6	33.0	34.7	42.7	43.9	58.8	52.4	43.8
88 Painswick Road	56.8	55.9	50.8	37.4	41.1	46.9	42.2	38.9	44.3	49.2	57.8	65.4	48.9
97 Painswick Road		54.1	49.6	35.7	39.6	42.0	29.3	30.3	40.7	43.6	41.2	54.4	41.9
106 Painswick Road	60.6	55.9	58.4	43.1	48.4	51.3	48.2	46.6	48.1	56.3	63.7	58.8	53.3
Barnwood Road													
53 Barnwood Road	61.4	59.1	56.3	47.1	47.8	49.8	36.1	37.6	50.0	49.5	56.4	58.5	50.8
61 Barnwood Road	61.7	62.0	58.3	54.2	61.0	57.9	36.2	43.3	52.8	56.8	68.3	56.9	55.8

Benzene Monthly data

2010 Benzene Data (corrected)													
Location	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Avg.
Glos Arts Centre	1.4	1.0	0.0	0.8	1.2	0.0	0.4	0.4	0.4	0.0	0.8		0.6
Millbrook Street	0.0	2.5	2.3	1.2	2.1	0.0	0.8	0.6	0.8	0.0	1.6		1.1
Elmbridge Junior School	0.0	1.2	1.0	0.4	0.6	0.0	0.4	0.0	0.4	0.0	0.8		0.4
Bristol Rd	2.0	1.8	2.0	1.4	0.4	0.0	0.6	0.4	0.8	0.0	1.2		0.9