City of Nottingham

Local Air Quality Management

Progress Report

April 2005

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Introduction

The Environment Act 1995 (the Act) required the Secretary of State to prepare a strategy the National Air Quality Strategy, containing policies for the assessment and management of air quality. The process of Local Air Quality Management has arisen from the Act.

Over the past five years Nottingham City Council has conducted reviews and assessments of local air quality and published its findings in the following reports:-

Air Quality Review and Assessment First Stage & Second Stage April 2000
Air Quality Review and Assessment Second & Third Stage Report September 2001
Local Air Quality Management: Updating and Screening Assessment October 2003
Local Air Quality Management: Detailed Assessment October 2004

These reports may be viewed at Nottingham City Council Offices or by visiting the internet site:-

http://www.nottinghamcity.gov.uk/sitemap/environment/pollution/air_pollution/air_quality.htm

This is Nottingham City Council's first Local Air Quality Management Progress Report carried out as part of the National Air Quality Strategy.
It details:

- Air quality monitoring information from a number of sites in the City
- Current and proposed developments that may affect or be affected by air quality
- An assessment of the monitoring results with respect to the air quality objectives

Background to Local Air Quality Management

The Environment Act 1995 Part IV introduced the concept of Local Air Quality Management. Section 82 of this Act required Local Authorities to review the air quality in their area and assess whether the Air Quality Standards and Objectives will be achieved by the prescribed date for each pollutant of concern. The Air Quality (England) Regulations 2000 (as amended) details the objectives for seven pollutants, to be achieved between 2003 and 2010 (Table 1, page 5).

The Regulations provide that 'achievement or likely achievement of the Air Quality Objectives is to be determined by reference to the quality of the air at locations which are situated outside of buildings….. and where members of the public are regularly present' (Table 2, page 6) It continues '… local authorities should have regard to those locations

where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective.'

The initial review and assessment process comprised three stages, each with increasing depth of investigation, designed to ensure only those pollutants which are predicted to exceed the Air Quality Objectives by the due date were assessed in the next stage. The reasons for proceeding to each subsequent stage of the review and assessment had to be clearly demonstrated, supported and in accordance with Government guidance.

Where it has been determined that an Air Quality Objective will not be achieved by the specified date, Section 83 of the Environment Act 1995 requires Local Authorities to designate Air Quality Management Areas (AQMAs) by Order and formulate and publish corresponding Air Quality Action Plans (AQAPs). The AQAP must specify what actions a Local Authority intends to take 'in pursuit of the air quality objectives', including a timetable for implementing the plan.

Table 1

The Air Quality (England) Regulations 2000 (as amended)

Substance	Air Quality Objective Levels	Air Quality Objective Dates
Benzene	16.25 micrograms per cubic metre or less, when expressed as a running annual mean 5 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2003 31st December 2010
1,3 - Butadiene	2.25 micrograms per cubic metre or less, when expressed as a running annual mean	31st December 2003
Carbon monoxide	10 milligrams per cubic metre or less, when expressed as a maximum daily running 8 hour mean	31st December 2003
Lead	0.5 micrograms per cubic metre or less, when expressed as an annual mean 0.25 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2004 31st December 2008
Nitrogen dioxide	200 micrograms per cubic metre, when expressed as an hourly mean, not to be exceeded more than 18 times a year 40 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2005 31st December 2005
PM_{10}	50 micrograms per cubic metre or less, when expressed as a 24 hour mean, not to be exceeded more than 35 times a year 40 micrograms per cubic metre or less, when expressed as an annual mean	31st December 2004 31st December 2004
Sulphur dioxide	125 micrograms per cubic metre or less, when expressed as a 24 hour mean, not to be exceeded more than 3 times a year 350 micrograms per cubic metre or less, when expressed as an hourly mean, not to be exceeded more than 24 times a year 266 micrograms per cubic metre or less, when expressed as a 15 minute mean, not to be exceeded more than 35 times a year	31st December 2004 31st December 2004 31st December 2005

Table 2

Examples of where the Air Quality Objectives should/should not apply.

Averaging Period	***Objectives should apply at***	***Objectives should generally not apply at***
Annual mean	All locations where members of the public might be regularly exposed. Facades of residential properties, schools, hospitals, libraries	Building facades of offices or other places of work. Gardens of residential properties. Kerbside sites or locations where public exposure is likely to be short term.
24-hour mean, 8-hour mean	All locations where the annual mean objective would apply. Gardens of residential properties.	Kerbside sites or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer	

When assessing likely exposure with respect to the long-term objectives LAQM.TG (03) cites ‘in the case of the 24-hour objectives, a relevant location would be one where members of the public may be exposed for 8 hours or more in a day, while for the annual mean objectives this might be where people are exposed for a cumulative period of 6 months in a year’.

Section 84(1) of the Environment Act 1995 requires authorities to carry out a further assessment of existing and likely future air quality in an AQMA. LAQM.TG(03) advises ‘The intention is that this further assessment will be used to define the relative contribution of different sources within the areas of exceedance, so as to allow a focused action plan to be prepared.’

However, the Stage 4 Review and Assessment (2003) concluded that the Air Quality Objectives in the three declared Air Quality Management Areas would be met by the due dates (mainly because of measures introduced by the Local Transport Plan) and the preparation of specific Air Quality Action Plans was therefore unnecessary.

The administrative framework LAQM.PG (03) Policy Guidance and LAQM.TG (03) Technical Guidance were published in February 2003 and advised Local Authorities to follow the guidance on the recommended phased approach to the review and assessment process set out in LAQM.TG (03);

i. An **Updating and Screening Assessment** (USA) for identifying those aspects that have changed since the first round of reviews and assessments; and
ii. A **Detailed Assessment** of those pollutants and specific locations that are identified in the USA as requiring further work.
iii. A **Progress Report** on the Local Authorities progress in implementing Air Quality Action Plans or maintaining air quality where the Air Quality Objectives are being met.

Future Air Quality Reviews and Assessments

The Government and devolved administrations recognise that Local Air Quality Management is fundamental to helping them achieve the Air Quality Objectives (AQOs) in the Air Quality (England) Regulations 2000 (as amended), many of which reflect legally binding EU limit values. It therefore recommends Local Authorities carry out their LAQM duties according to the timescales detailed in Table 3 overleaf.

DEFRA recommends that local authorities should prepare annual air quality Progress Reports between subsequent rounds of reviews and assessments to ensure continuity in the LAQM process. It also requested that monitoring data be reported over the period of a calendar year. Thus the Progress Reports due by the end of April 2005 and April 2008 will report data gathered during 2004 and 2007 respectively. Where, following the Updating and Screening Assessments in April 2006 and 2009 it is determined that Detailed Assessments are not required, authorities will be expected to submit Progress Reports in 2007 and 2010.

Table 3

Recommended timescales for submission of Reviews and Assessments and Progress Reports

LAQM Activity	Completion Date	Which Authorities?
Progress Report	End of April 2005	All Authorities
Updating & Screening Assessment (USA)	End of April 2006	All Authorities
Detailed Assessment	End of April 2007	Those authorities which identified the need for a DA in their April 2006 USA
Progress Report	End of April 2007	Those authorities which identified that there was no need for a DA in their April 2006 USA
Progress Report	End of April 2008	All authorities
USA	End of April 2009	All authorities
Detailed Assessment	End of April 2010	Those authorities which have identified the need for one in their April 2009 USA
Progress Report	End of April 2010	Those authorities which identified that there was no need for a DA in their April 2009 USA

Updating and Screening Assessment 2003: Conclusions

The Updating and Screening Assessment was undertaken following the guidance and checklist scheme recommended in LAQM.TG(03).

It was concluded that it was unnecessary to proceed to a Detailed Assessment for

Lead

Carbon monoxide

Benzene

1,3 butadiene

Particles (PM_{10})

It was concluded that it was necessary to proceed to a Detailed Assessment for **Sulphur dioxide** and **Nitrogen dioxide.**

Detailed Assessment 2004: Conclusions

Sulphur dioxide

The Detailed Assessment 2004 predicted that the 15-minute mean Air Quality Objective of 266 μgm^{-3} not to be exceeded more than 35 times a year by 31.12.2005 is likely to be met at locations of 'relevant exposure' at Nottingham Mainline Station.

Nitrogen dioxide

The Detailed Assessment 2004 predicted that the annual mean Air Quality Objective of 40 μgm^{-3} by 31.12.2005 is likely to be met at locations of 'relevant exposure' in the Nottingham City area.

Consequently it was not necessary to declare any new Air Quality Management Areas or amend the existing Air Quality Management Areas.

Air Quality Action Plans

Complex modelling carried out as part of the Detailed Assessment predicted that the Air Quality Objectives for sulphur dioxide and nitrogen dioxide will be met at all relevant locations by the due dates 2004/2005. **It was not therefore necessary to prepare any Air Quality Action Plans.**

Progress Report 2005

Monitoring Information

Monitoring assists in demonstrating whether Air Quality Objectives (AQOs) are being met and in assessing whether there is a significant risk of Air Quality Strategy objectives being exceeded at a relevant location. Nottingham City Council undertakes automatic monitoring in a number of locations and provides local site operators, LSOs for DEFRA's Automatic Urban and Rural Network, AURN site on Clinton Street East.

The monitoring programme also includes non-automatic sampling for nitrogen dioxide using passive diffusion tubes. Diffusion tubes are low cost and low maintenance and allow an increased number of locations/areas to be monitored.

Descriptions of Monitoring Locations

To assist in identifying a monitoring locality and its appropriateness for use in air quality assessments eight site types are described in LAQM.TG(03). Four site types describe the locations in Nottingham:

Urban centre - an urban location representative of typical population exposure in towns or city centres.

Urban background - an urban location distanced from sources and therefore broadly representative of city-wide background conditions.

Roadside - a site between 1m of the kerbside of a busy road and the back of the pavement. Typically this will be within 5m of the road, but could be up to 15m.

Other - any special source-orientated or location category covering monitoring undertaken in relation to specific emission sources

Nottingham City Continuous Automatic Monitoring Sites

AURN – Clinton Street East, City Centre

The AURN station is located in the city centre. It is classed as an 'Urban centre' site. The surrounding area comprises retail outlets and city centre business premises in an urban pedestrian area. The nearest road, the A6008, is a major through-route approximately 30 metres to the north of the site.

The monitoring equipment is housed in a self-contained, air-conditioned fixed unit. The manifold inlet is approximately 3 metres high and has continuous automatic analysers that measure CO, NO, NO_2, NOx, PM_{10}, SO_2 and ozone.

AQMS – Queens Medical Centre, Clifton Boulevard

The AQMS station is a mobile unit and has been in its current location since March 2002. The site is in a suburban mixed industrial/commercial/residential area of the City adjacent to the A52. It is classed as an 'Other' site. It is 25 metres from the A52 ring road and approximately 5 metres from a minor service road.

The self-contained, air-conditioned station has a sampling inlet approximately 2.5 metres high and has continuous automatic analysers that measure CO, NO, NO_2, NOx, PM_{10}, SO_2 and ozone. Temperature, wind speed and wind direction are also measured.

Carter Gate NOx Station – City Centre

This is a fixed unit located at Carter Gate since December 2003. The site is a suburban mixed commercial/residential area of the City adjacent to the A60. It is classed as a 'Roadside' site and is approximately 10 metres from the A60 and approximately 2 metres from a minor road.

The sampling inlet for the self-contained, air-conditioned enclosure is approximately 2.5 metres high. NO, NO_2 and NOx are measured using a continuous automatic analyser.

City Hospital SO_2 Station – Sherwood

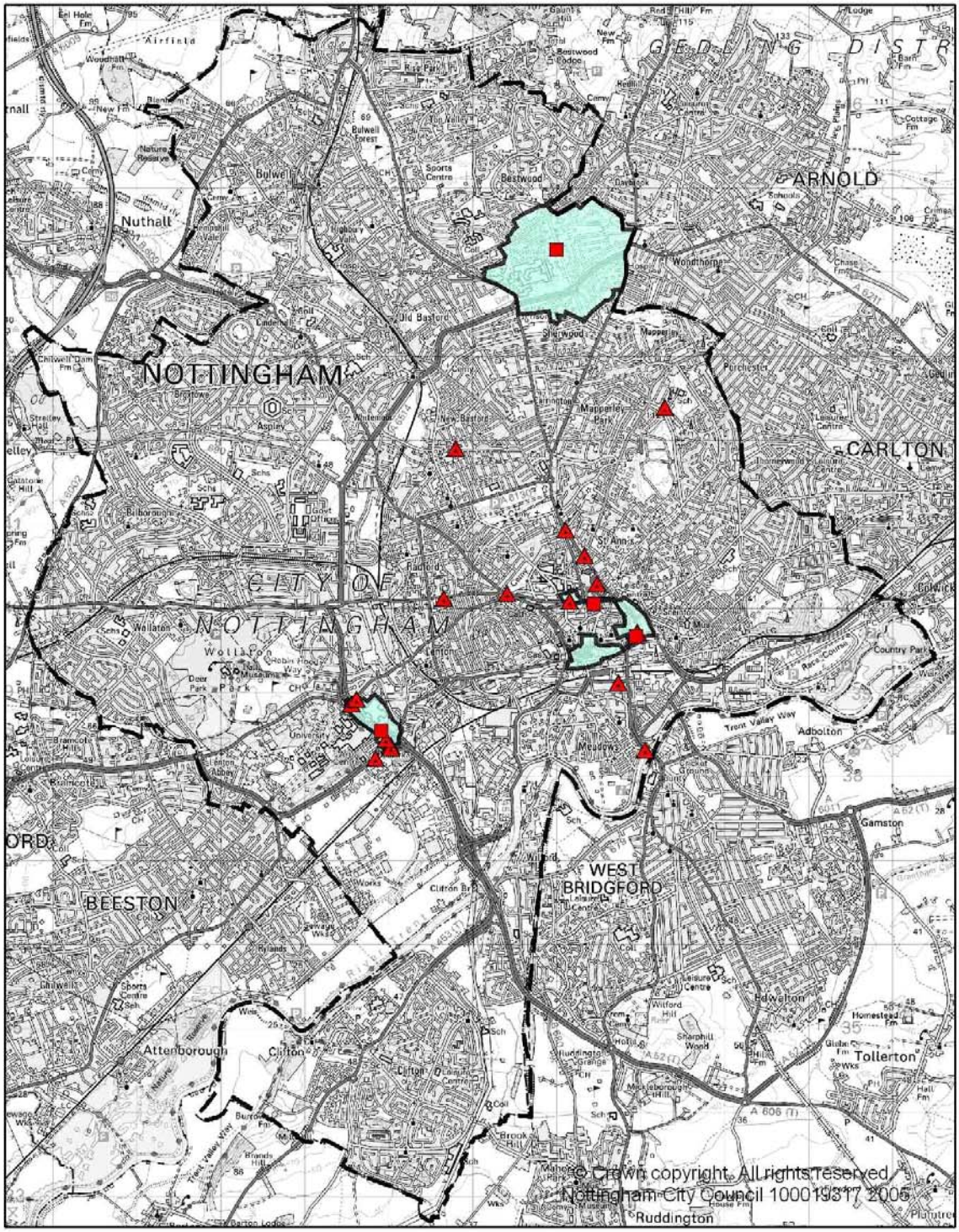
This is a fixed unit located at the City Hospital since March 2003. The site is in a suburban residential area of the City. It is classed as an 'Other' site.

The unit is approximately 100 metres from the coal fired boiler plant in an area where modelling predicts the greatest ground level concentrations are likely to occur. The sampling inlet for the self-contained, air-conditioned unit is approximately 1.5 metres high. The continuous automatic analyser measures SO_2.

The geographical locations of all Nottingham City monitoring sites and AQMAs are shown in Figure 1 page 12. More detailed maps focusing on the AQMAs can be found in Appendix 4 Figures A4 -1 to A4 - 4, pages 47 to 50.

Figure 1

Nottingham City Council Monitoring Sites & Air Quality Management Areas



Key

- Diffusion Tube
- Continuous Analysers
- Air Quality Management Areas
- City Boundary

0 1 2 3 4 Kilometres

City of NOTTINGHAM
City Development
Pollution Control Section

N

Scale : 1:66000
Drawn : DJH/JA
Date : April 2005

Monitoring Data

Monitoring results are preferably reported on a calendar year basis, for clarity of the measurement period and more importantly to present data recorded over the full range of yearly weather conditions. However the Carter Gate and City Hospital sites have been relatively recently established and initially there were problems with data capture rates. So the data for these two sites relates to April 2004 to March 2005 so that a full year's monitoring data are included

Annual summary statistics for monitoring data from the sites with continuous automatic analysers are given in Tables 4 to 7, pages 14 to 16.

Quality Assurance and Control (QA/QC)

See Nottingham City Council's Second and Third Stage Review and Assessment 2001 - Technical Annexe for further information on the types of monitoring equipment operated and the QA/QC procedures used.

http://www.nottinghamcity.gov.uk/airqualitystrategy.pdf

Table 4

2004 Annual Summary Statistics for Pollutants Measured at AURN, Clinton Street East, City Centre

Nitrogen Dioxide NO_2		
	μgm^{-3}	**Objective exceeded?**
Annual mean	34.7	No
Maximum 1 hour mean	172	No
Data Capture	90.5%	
Sulphur Dioxide SO_2		
	μgm^{-3}	**Objective exceeded?**
Maximum 15 minute mean	178	No
Maximum 1 hour mean	117	No
Maximum 24 hour mean	35	No
Data Capture	95.7%	
Particulate Matter PM_{10} (Gr Eq)		
	μgm^{-3}	**Objective exceeded?**
Annual mean	22.5	No
Maximum 24 hour mean	57 6 occurrences >= 50 ☒gm^{-3}	No
Data Capture	97.3%	
Carbon Monoxide CO		
	mgm^{-3}	**Objective exceeded?**
Maximum daily running 8 hour mean	2.2	No
Data Capture	91.3%	

12 months data – 01.01.04 to 30.09.04 ratified Gr.eq = gravimetric equivalent

Table 5

2004 Annual Summary Statistics for Pollutants Measured at AQMS, Queens Medical Centre, Clifton Boulevard

Nitrogen Dioxide NO_2		
	μgm^{-3}	**Objective exceeded?**
Annual mean	36.5	No
Maximum 1 hour mean	131.8	No
Data Capture	99.3%	
Sulphur Dioxide SO_2		
	μgm^{-3}	**Objective exceeded?**
Maximum 15 minute mean	180.3	No
Maximum 1 hour mean	127.9	No
Maximum 24 hour mean	21.8	No
Data Capture	98.5%	
Particulate Matter PM_{10} (Gr eq)		
	μgm^{-3}	**Objective exceeded?**
Annual mean	25.2	No
Maximum 24 hour mean	71.2 8 occurrences >= 50 ☒gm^{-3}	No
Data Capture	96.7%	
Carbon Monoxide CO		
	mgm^{-3}	**Objective exceeded?**
Maximum daily running 8 hour mean	2.5	No
Data Capture	99.5%	

12 months data – 01.01.04 to 31.12.04 Gr.eq = gravimetric equivalent

Table 6

2004/05 Annual Summary Statistics for Nitrogen Dioxide Measured at Carter Gate, City Centre

Nitrogen Dioxide NO_2		
	μgm^{-3}	**Objective exceeded?**
Annual mean	43.2	**Yes**
Maximum 1 hour mean	150.9	No
Data Capture	92.4%	

12 months data – 02.04.04 to 31.03.05

Table 7

2004/05 Annual Summary Statistics for Sulphur Dioxide Measured at City Hospital Site, Edwards Lane.

Sulphur Dioxide SO_2		
	μgm^{-3}	**Objective exceeded?**
Maximum 15 minute mean	131.7	No
Maximum 1 hour mean	63.6	No
Maximum 24 hour mean	20.0	No
Data Capture	93.8%	

12 months data – 02.04.04 to 31.03.05

The above summary data shows that the short term objectives for NO_2, SO_2, PM_{10} and CO have not been exceeded at any of the sites. The annual mean objective for nitrogen dioxide was exceeded at Carter Gate which is a roadside site within AQMA 1. All other annual mean objectives were met at all of the sites.

Nottingham City Nitrogen Dioxide Diffusion Tube Monitoring Sites

Nottingham City participates in the UK NO_2 diffusion tube network and has recently expanded the number of diffusion tube monitoring sites. More tubes have been exposed in AQMAs 1 and 2 and in other areas where there may be 'hot spots' due to road and/or traffic changes.

The geographical locations of the sites and the AQMAs are shown in Figure 1 page 12 and in more detail in Appendix 4 Figures A4-1 to A4-4 pages 47 -50.

Monitoring Data

Diffusion tubes are a useful means of collecting data across an area but it is recognised that a number of factors associated with exposure periods, tube preparation method and the laboratory preparing and analysing the tubes can influence the results. Therefore the laboratory bias should be determined so that results can be adjusted to give a better estimate of the actual concentrations.

Following the guidance given in LAQM TG(3) Nottingham City co-located diffusion tubes with the AURN, AQMS and Carter Gate continuous automatic analysers to enable a 'bias adjustment' factor to be determined.

A bias adjustment factor A = 0.818 was applied to the measured diffusion tube results. Table 8 shows the average biased and unbiased nitrogen dioxide concentrations for the time period that tubes have been exposed at each location.

Information about the bias adjustment factor and its derivation; on the laboratory used for diffusion tubes supply and analysis; the tube preparation method and the exposure period are given in Appendix 4 page 51.

Quality Assurance and Control QA/QC and Laboratory Information

See Appendix 4 and Nottingham City Council's Second and Third Stage Review and Assessment 2001 - Technical Annexe for further information on diffusion tubes and the QA/QC procedures used.

http://www.nottinghamcity.gov.uk/airqualitystrategy.pdf

Table 8

Diffusion Tube Nitrogen Dioxide Concentrations

Site Type	Site ID	Location	Number of months	Bias Adjusted Average NO_2 μgm^{-3}	Unbiased Data Average NO_2 μgm^{-3}
R	*A	Beeston Road (1)	10	**46**	56.8
R	*B	Langtry's PH Upper Parl. St	10	**49**	59.5
R	C	Mansfield Road (1)	1	**58**	71.0
R	D	High Cross Woodbrgh Rd.	4	**47**	57.5
R	E	Selincourt Queen's Road	1	**48**	59.0
R	F	Trent Bridge	4	37	45.8
O	G	Perth Street	10	32	39.0
R	*H	Beeston Road (2)	4	**64**	78.5
R	I	Beeston Road (3)	1	**61**	74.0
R	*J	Clifton Boulevard	1	**44**	54.0
R	*K	Derby Road A	10	39	47.5
R	L	Derby Road B	4	**43**	52.8
R	M	Canning Terrace	1	**52**	63.0
R	*N	The Castle PH Lower Parl. St.	1	**55**	67.0
R	P	Ilkeston Road - NS	10	25	31.0
UB	Q	Ransom Drive - NS	10	9	11.2
UB	S	Noel Street Baths - NS	10	24	28.9

* denotes within an existing AQMA 10 months data May 2004 to February 2005

R = roadside O = other UB = urban background NS = national survey

Where the concentrations are above the AQO for annual mean NO_2 they are in bold type face.

The results for the sites inside AQMAs (with one exception) show that the AQO is exceeded although it should be noted that the averaging period varies from one to ten months. The other sites with NO_2 concentrations higher than 40 μgm^{-3} were identified as possible hot spots due to changes in traffic flow and/or road layout. For sites with one or four months' data the tubes have only been exposed in the winter months when NO_2 concentrations tend to be higher.

These early results suggest that it is appropriate and necessary to continue with monitoring in these locations.

LAQM TG (03) guidance advises that annual means can be estimated from short term monitoring data. And that annual average NO_2 for future years can be estimated from measured data at road side sites. Neither of these techniques has been applied to the above results. The data spreads over 2004 and 2005 and as shown in Figure 7, page 22 the NO_2 concentrations at the long term diffusion tube roadside site i.e. Ilkeston Road have little variation in annual mean level over the last four years.

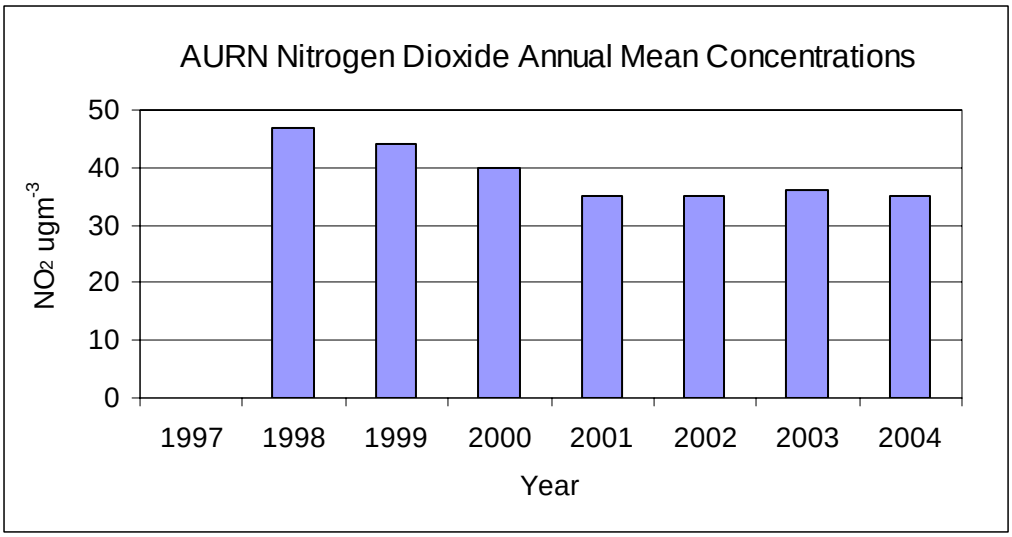
Pollutant Trend Data

Annual means at the AURN, Clinton St. East, City Centre

Of the four continuous monitoring sites only the AURN, established in September 1996, has more than five years of monitoring data. This is because the Carter Gate and City Hospital sites have been in place for less than two years and as a mobile unit the AQMS has been moved to different locations.

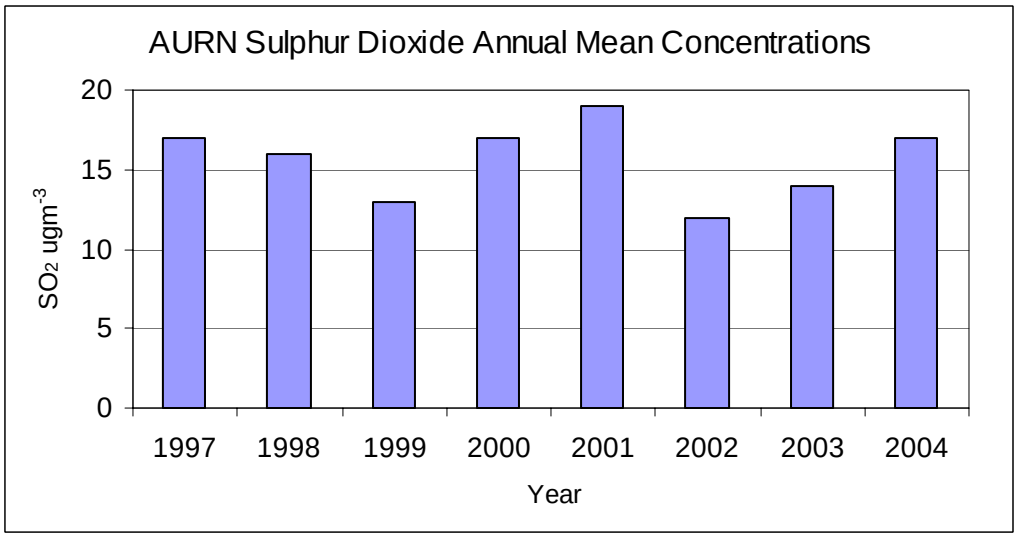
The two pollutants of concern for the purposes of this report and to which the AQMAs relate are nitrogen dioxide and sulphur dioxide. Graphs of the annual means for NO_2 and SO_2 between 1997 or 1998 and 2004 are shown in Figures 2 and 3, page 20. The equivalent data for PM_{10}, CO and ozone are given in the Appendix 4 Figures A4 -5 to A4 -7, pages 53 to 54.

Figure 2



Nitrogen dioxide levels decreased between 1998 and 2001. For the last four years the mean concentrations have been similar even though the meteorology for each year has varied. The annual mean AQO has not been exceeded at this site since 2000.

Figure 3



The Air Quality Objectives for SO_2 are based on short time periods, 15 minutes, 1 hour and 24 hour. The annual mean concentrations for 1997 to 2004 Figure 3 above are very low and show that for the last eight years ambient SO_2 levels have been similar with relative small inter-year variation.

The diurnal variations in nitrogen dioxide concentrations at the continuous monitoring sites are shown in Figures 4 to 6, page 21. The pattern of variation is similar at all sites with the highest levels recorded at the Carter Gate (CG) roadside site. The contrast in concentrations between the weekdays with the two ‘rush hour’ peaks and the Saturday and Sunday levels shows that traffic is the major source of nitrogen dioxide at these sites.

Figure 4

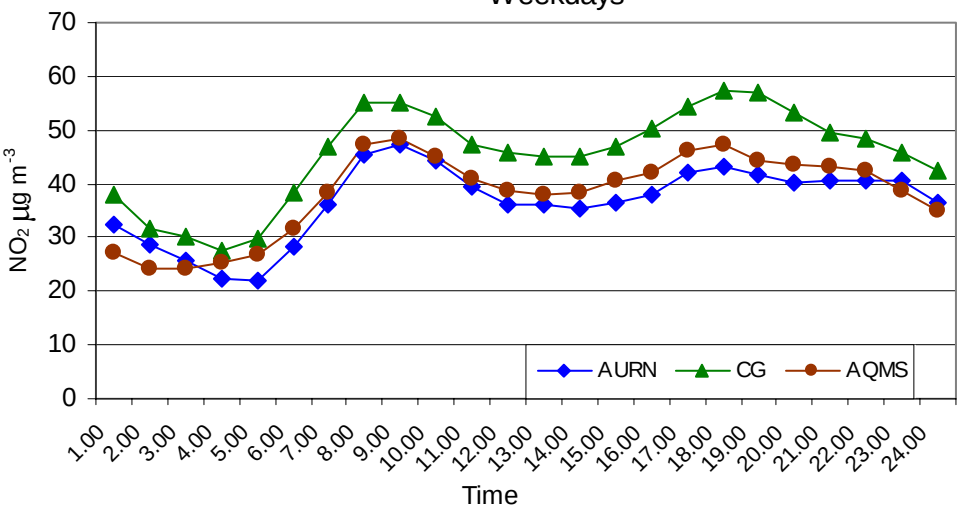


Figure 5

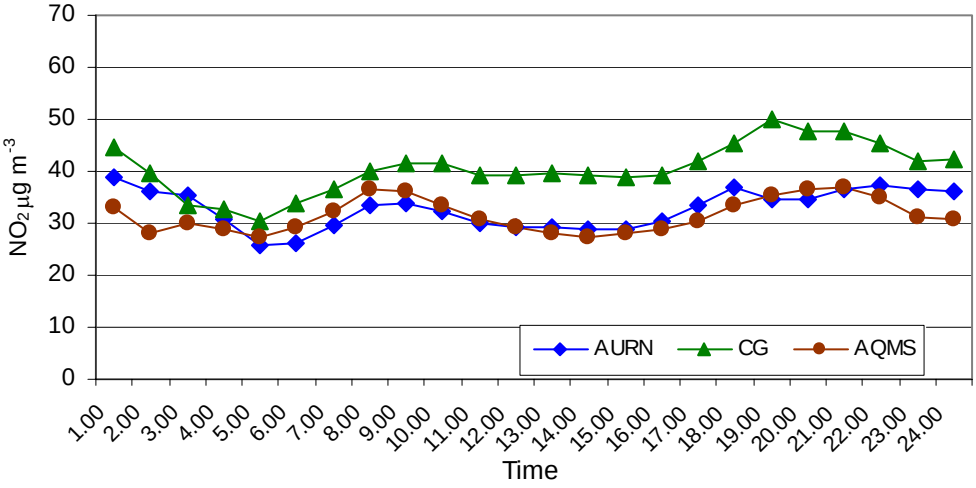
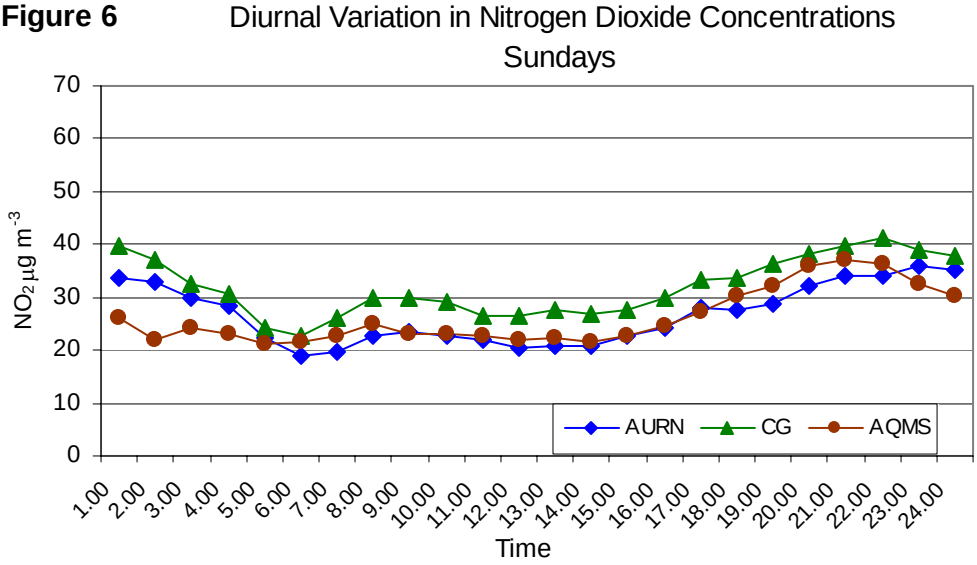


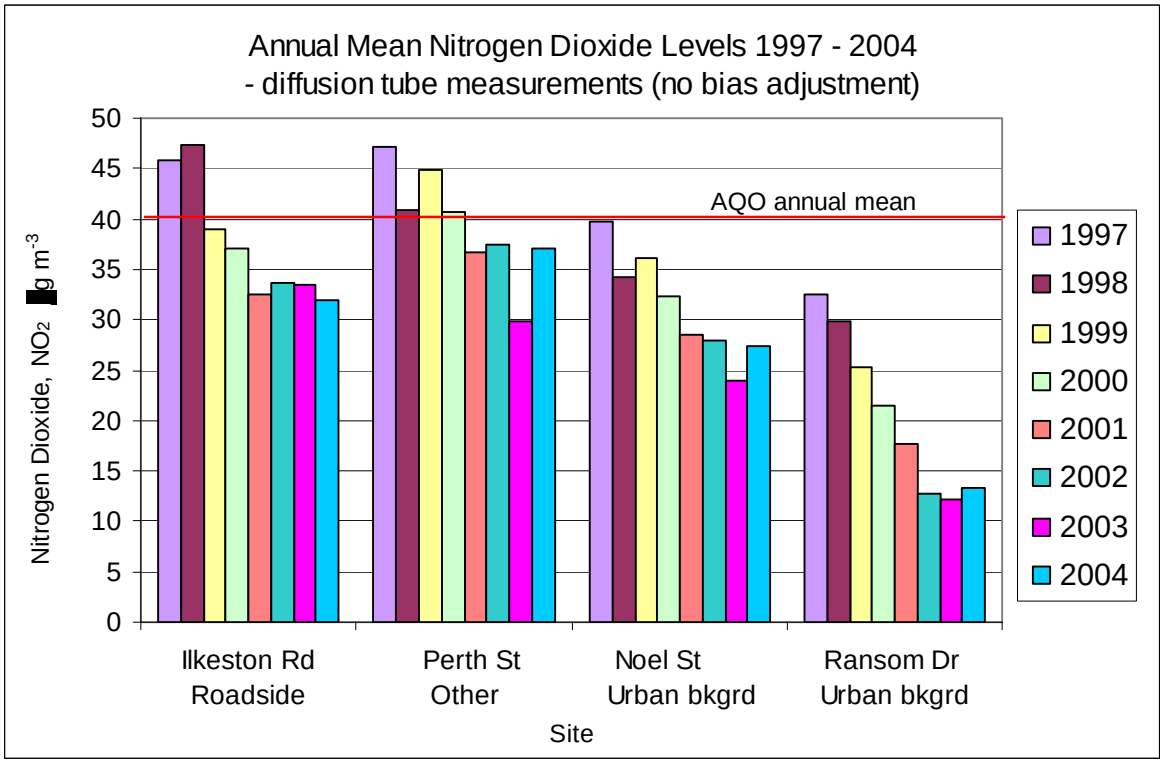
Figure 6



Nitrogen Dioxide Annual Means - diffusion tube measurements

The UK network sites have been in place since 1993. The annual mean results for these sites for 1997-2004 are reported in Figure 7 and show that has been a general downward trend in NO_2 levels since 1997. At each individual site the concentrations have been similar for the last three or four years and the annual mean AQO has not been exceeded.

Figure 7



No bias adjustment has been made because the co-location study referred to previously relates to 2004/ 2005. It should be noted that Perth Street is no longer a network site.

Assessment of Monitoring Data in Relation to Likely Exceedance of Objectives

Within existing Air Quality Management Areas.

AQMA 1 – Nottingham City Hospital Sulphur Dioxide

Monitoring data from the continuous sulphur dioxide analyser demonstrates that none of the Air Quality Objectives were exceeded during 12 months (full range of meteorological conditions), the maxima were significantly lower than the AQOs.

AQMA 2 – Nitrogen Dioxide – Nottingham City Centre

Within this AQMA the monitoring suggests that the NO_2 annual mean objective will be met in some areas but not in others.

The AURN site is not within the AQMA but is close by. The AURN monitoring data shows that the NO_2 annual mean objective was achieved in 2004. The trend data demonstrates that at this site the objective has consistently been achieved since 2001 and is highly likely to be achieved by the due date of 31st December 2005.

The monitoring data from the roadside monitor at Carter Gate indicates that the NO_2 annual mean objective was exceeded for the 12 months from April 2004 to March 2005. This suggests that the objective will not be achieved by the due date.

Diffusion tube results from within this AQMA show that the average nitrogen dioxide concentration over 10 months exceeded 40 μgm^{-3}. This also suggests that the objective will not be achieved by the due date at those locations. With respect to Site B (Upper Parliament Street) significant long term traffic disruption due to road works will have contributed to the high results.

The monitoring data from the two continuous analysers showed that there were no exceedances of the 1-hour AQO at either of the sites. Therefore it is highly likely that this objective will be met by the due date of 31st December 2005.

AQMA 3 – Nitrogen Dioxide – Clifton Boulevard, Nottingham A52 Ring Road

Within this Air Quality Management Area the AQMS monitoring data shows that the NO_2 annual mean and 1-hour objectives were achieved in 2004.

The results from diffusion tubes located within the AQMA show that average nitrogen dioxide concentrations greater than 40 μgm^{-3} were measured at three locations.

The lack of monitoring data for this AQMA prevents a definite conclusion being reached as to the likelihood of achieving the annual mean objective across the whole of the AQMA by the 31st December 2005.

Other areas

Additional nitrogen dioxide diffusion tube monitoring was introduced in November 2004 as a consequence of the findings of the Detailed Assessment 2004 and road layout/traffic flow changes.

The limited results show that average nitrogen dioxide concentrations greater than 40μgm^{-3} were measured at six of the seven locations.

Implementation of Action Plans

Nottingham does not have any specific 'Air Quality Action Plans' because computer modelling predicted that the Air Quality Objectives would be achieved by the due dates. Furthermore, as AQMAs 2 and 3 are transport related and occurring on main routes through and around the City, the LTP was and is addressing the transport sources affecting air quality by encouraging modal shift, halting vehicle growth, consequently reducing congestion. This is important because as the vehicle fleet is replaced by lower emission vehicles the reductions in pollutant emissions will not be undermined by increasing traffic growth, which is seen throughout other large UK cities.

Progress on Local Air Quality Strategies

Nottingham City is a signatory to the Nottinghamshire Air Quality Strategy (October 2001). The Strategy summarises and re-iterates elements of Local Plans and Local Transport Plans designed to reduce air pollution by encouraging alternative transport modes to the private motor vehicle and encourages sustainable development.

The Strategy is due for review by the Nottinghamshire Environmental Protection Working Group and Nottinghamshire Air Quality Steering Group during 2005.
The current strategy may be viewed at:

http://www.nottinghamcity.gov.uk/airstratgey.doc

Progress on Implementing Elements of Local Transport Plan that Might and Do Affect Air Quality

Nottingham City has a number of strategies and plans listed below, that directly or indirectly affect air quality, particularly by the reduction of emissions associated with road transport.

- Local Transport Plan 2001/2 - 2005/6
- Local Transport Plan: Progress Report 2000/01 (August 2001)
- Local Transport Plan: Progress Report 2003/04 (July 2004)
- Walking and Cycling Strategy 1999
- New Deal for Transport: Better for Nottingham 1999
- Public Transport Plan 2000
- Accessibility Planning for Bus Travel 2003

The Big Wheel

Greater Nottingham's integrated transport plan, based on the Local Transport Plan produced by Nottingham City and County Councils, is called The Big Wheel. See http://www.thebigwheel.org.uk

The plan is an integrated public transport strategic vision launched in Autumn 2001. Several elements have been implemented or are in progress:

- Turning Point – an integrated transport scheme (part of the City Centre Major plan) to reduce dominance of traffic on Nottingham's inner ring road. Road layouts and routes are currently being altered. They are linked to the Trinity Square redevelopment which is also in progress.

- Nottingham Express Transit – Line one of Nottingham's tram system became operational in March 2004.

  Proposals for two further routes, City to Clifton via Wilford and City to Toton via Beeston and Chilwell were submitted to Government in 2004. The process has been affected by the Government's review of Light Rail systems.

  Detailed information and maps of the proposed routes can be found on the internet site http://www.netphasetwo.com

The House of Commons Transport Committee's report 'Integrated Transport: the Future of Light Rail and Modern Trams in the United Kingdom published April 2005 recognised Nottingham Express Transit as an example of 'a successfully integrated system'.

http://www.publications.parliament.uk/pa/cm200405/cmselect/cmtran/378/378i.pdf

Any decision on the proposed future routes will now be delayed until at least Summer 2005.

- Clear Zone - in Nottingham's City centre all but essential traffic is excluded from the designated Clear Zone during the middle of the day.

- Workplace Parking Levy (WPL) - work towards the implementation of the Workplace Parking Levy is continuing, although the programme and timetable have been revised.

  www.nottinghamcity.gov.uk/sitemap/transport_and_streets/transport_planning/cdt_workplace_parking_levy.htm

- The Chain Reaction – a Ring Road scheme focussed on providing better bus services, transport interchanges and more Park and Ride Link buses. It includes a guided bus running along the central reservation of the Ring Road, linked into the main radial bus and tram services. Proposed in LTP 2006-2010.

Nottingham East Midlands Airport (NEMA) Expansion

(proposals at consultation stage).

Following the Government's White Paper on the Air Industry NEMA proposed a number of changes to flight paths and routing to facilitate a growth in flight and passenger numbers. The proposals and their likely impacts were assessed. An increase in flight and passenger numbers has the potential to increase the number of private vehicles accessing NEMA.

Alternative transport provision will be required to mitigate or reduce the potential impact of these additional journeys. The 'Skylink' bus service currently offers a transport alternative to the private motor vehicle.

Proposed Nottingham Parkway Railway Station

Midland Mainline and partners have submitted a planning application for an East Midlands Parkway station, with 1,000 car parking spaces plus coach and taxi interchange facilities, to be located in the A453 corridor adjacent to Ratcliffe Power Station within the Plan area. If approved, in addition to providing a new facility for Greater Nottingham residents to access

rail services on the Midland Mainline, encouragement will be given to promoting the station as a park and ride opportunity for commuters, shoppers and visitors to Nottingham City Centre. It will also facilitate the provision of a bus link between Nottingham Parkway and Nottingham East Midlands Airport. (Local Transport Plan 2000/1 – 2005/6 4.4.2)

List of Planning Applications that have the Potential to Affect Local Air Quality 2005-2010

Within or adjacent to AQMA 2 - Nitrogen dioxide.

The geographical location of the following developments is shown in Figure 8, page31.

i. Trinity Square Redevelopment, Mansfield Road.

Planning Ref. 03/01246/PFUL3 decided and commenced.

Retail, leisure, residential, car parking and associated changes to traffic flows/routes (Big Wheel/Turning Point)

An Integrated Transport Assessment (ITA) was undertaken by BWB Partnership in consultation with Nottingham City Council and submitted as part of application's supporting documentation.

http://plan4.nottinghamcity.gov.uk/Volume1/000/244/110/244110_6.pdf

The ITA describes its integration with the Council's Turning Point plans for this area. The proposals restrict vehicle access and divert remaining east-west cross town traffic around the development area. It is considered that because of the reduction in car parking places compared to the current Trinity Square/ Birkbeck House car-parks and restriction of through traffic vehicle pollution will be reduced.

The measures have yet to be modelled and their impact on air quality quantified as part of the City Council's own LAQM assessment.

ii. Former Hicking Pentecost, Queens Road Redevelopment

Planning Ref. 02/00365/PFUL3 amended by 03/02765/PFUL3, commenced 2004
Planning Ref. 04/02843/PFUL3 - Transport Assessment

350 residential units and 230 car parking spaces
http://plan4.nottinghamcity.gov.uk/Volume2/000/321/748/321748_2.pdf

iii. Former Boots H Block, Station Street/London Road Redevelopment

Planning Ref. 03/02599/PFUL3 decided and commenced.

Planning Ref. 04/01278/PDS4 – Air Quality Assessment (emissions from EnviroEnergy Heat Station)

Residential units, hotel, office and car park. (156 car parking spaces)

Expected additional 400 daily vehicle movements on to Station Street/London Road (combined AADT 40,000+), insignificant contribution to NO_2 concentrations in AQMA 2.

iv. Nottingham Eastside, Island Business Centre, City Link

Planning Ref. 04/01403/POUT decided January 2005, not commenced.

Proposed leisure, residential, offices and car parking.

A Transport Assessment i.e. Environmental Statement Volume 3 Transport Assessment Parts 1 & 2 undertaken by the applicant was submitted as part of application's supporting documentation.

The assessment concludes slight increases in peak hour journeys associated with the development but a potential sustained decrease in north-south bound through traffic from when site preparation/construction work commences.

http://plan4.nottinghamcity.gov.uk/Volume2/000/293/680/293680_33.pdf

v. Broadmarsh Redevelopment, Lister Gate

Planning Ref. 02/01261/POUT decided 2004, not commenced.

Retail, leisure, bus/tram interchange, car parking associated changes to road network flows/routes.

Integrated Transport Assessment (ITA) undertaken by Savell Bird & Axon and submitted as part of application's supporting documentation. The ITA Section 7 Methodology describes the proposals impact and its main outcome of suppressing traffic capacity in the Broadmarsh area and reducing through traffic. The measures have yet to be modelled and their impact on air quality quantified.

http://plan4.nottinghamcity.gov.uk/Volume1/000/185/038/185038_52.pdf

vi. Nottingham Station Redevelopment Brief MU3.5

Office, retail uses with car parking. Developers are required to consider the impact of development on air quality.

vii. Arkwright Triangle Plaza Redevelopment Brief MU3.3 & 3.9

Office, retail uses with car parking. Developers are required to consider impact of development on air quality.

viii. Meadows Gateway Redevelopment Brief

Office, retail uses with car parking. Developers are required to consider impact of development on air quality.

Within or adjacent to AQMA 3 - Nitrogen dioxide

Nottingham Express Transit - Phase 2 Nottingham City to Chilwell via Beeston

See page 25

Elsewhere in Nottingham City Area

Clifton East and Holme Farm

Residential developments. Developer required to evaluate impact of associated vehicles on air quality.

New Industrial Developments in Nottingham City Area

Pollution Control Act 1999 - Integrated Pollution Prevention and Control
New Installations/ Activities

Part A(1) - Environment Agency

F.W. Farnsworth Ltd., Pork Farms Bowyers, Crossgate Drive, Meadows, Nottingham. Treatment of animal and vegetable matter and food industries. Regulation of an existing industrial process.

Part A(2) - Local Authority (LA IPPC):

Polestar Chromoworks, Wigman Road, Bilborough, Nottingham

Transfer from existing Part B to Part A(2) application pending April 05**.** Regulation of an existing process.

Part B - **Local Authority (LA PPC):**

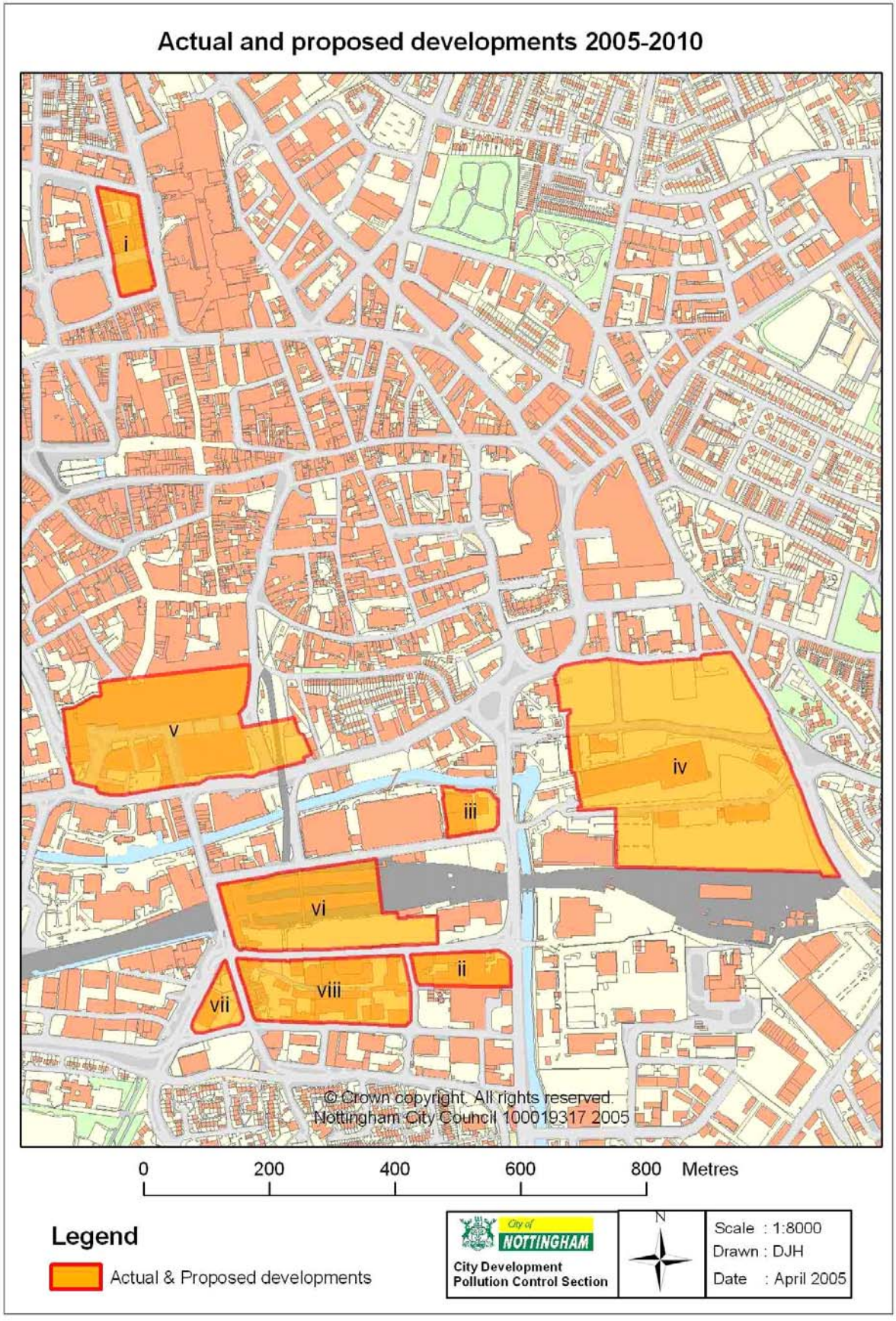
Skills Motors, Bulwell.

Waste Oil Burner <0.4 MW, permitted January 05. Permitted process relocated from a site within Nottingham.

Oversolve Ltd, Unit 6, Robin Hood Industrial Est., Alfred Street South, St Anns.

Flexible Packaging Print Process permitted April 2005. Regulation of an existing process.

Figure 8


Actual and proposed developments 2005-2010
i
v
iv
iii
vi
ii
vii
viii
© Crown copyright. All rights reserved.
Nottingham City Council 100019317 2005
0
200
400
600
800
Metres
Legend
Actual & Proposed developments
City of NOTTINGHAM
City Development
Pollution Control Section
N
Scale : 1:8000
Drawn : DJH
Date : April 2005

Progress Report 2005 Conclusion

The Environment Act 1995 Section 83(2) states 'An Order under this section may as a result of a subsequent air quality review;-

(a) be varied by a subsequent Order; or

(b) be revoked by such an Order,

if it appears on that subsequent Air Quality Review that the Air Quality Standards and Objectives are being achieved, and are likely throughout the relevant period to be achieved, within the designated area.

AQMA 1 – Sulphur Dioxide, Nottingham City Hospital NHS Trust, Sherwood.

In the Review and Assessment Stage 4: 2003, based on advanced dispersion modelling, it was concluded that the Air Quality Objectives would not be exceeded.

The Updating and Screening Assessment 2003 and the Detailed Assessment 2004 confirmed this conclusion.

Continuous automatic monitoring data shows that all three air quality objectives for sulphur dioxide were met by a wide margin. Based on this monitoring data and that there are no plans to increase the capacity of the plant the continued need for the AQMA has been reviewed and will be subject to scrutiny by elected Members with a view to revocation.

AQMA 2 – Nitrogen Dioxide, Nottingham City Centre.

Monitoring data shows that annual mean objective of 40 μgm^{-3} for nitrogen dioxide was met in some parts of the AQMA but not in other parts.

Significant alterations to traffic flows and prolonged disruption arising from implementation of elements of the Transport Plan are likely to have contributed to increased nitrogen dioxide concentrations in parts of AQMA 2. This situation is likely to continue for the next 12 months whilst other Transport Plan projects are completed.

The impact on air quality of these Transport Plan projects and developments can only be measured and more fully assessed following their completion.

It is therefore necessary to maintain the AQMA and continue the current level of monitoring within and adjacent to it.

AQMA 3 - Nitrogen Dioxide, A52 Ring Road, Dunkirk

Monitoring data shows that annual mean objective of 40 μgm^{-3} for nitrogen dioxide was met but limited data from diffusion tubes suggest that it may not be met in other parts.

It is therefore necessary to maintain the AQMA and continue the current level of monitoring within and adjacent to it.

What happens next?

The administrative framework LAQM.PGA(05) Policy Guidance Addendum published March 2005 recommends that Local Authorities should integrate their Air Quality Action Plans (AQAPs) into the LTP. Authorities with AQMAs relating to trunk roads/motorways should report within the LTP on any joint work with the Highways Agency and also include measures within the local authorities' remit that will improve air quality in the AQMA.

Work to integrate an Air Quality Action Plan within the Local Transport Plan 2 has commenced and the AQAP will be submitted as part of the provisional Transport Plan for Greater Nottingham to the Department for Transport in July 2005.

The data from the increased number of monitoring sites will allow further work to refine the advanced computer dispersion model used to predict pollution concentrations to be undertaken. This will assist in determining more accurately any predicted exceeds of AQOs and their geographical extent.

In the context of the Local Air Quality Management process this work will also contribute to the next Updating and Screening Assessment which must be submitted by the end of April 2006.

Appendix 1

Updates to planning policies that relate specifically to air quality

http://www.nottinghamcity.gov.uk/coun/department/des/dev_con3/docs/proposedmodification.pdf

Nottingham has recently published its Local Plan Review (February 2005). It replaces the Nottingham Local Plan (adopted 1997) and has an end date of 2011.

It was prepared, drafted and consulted upon prior to the Planning and Compulsory Purchase Act 2004 which requires Local Plans to be replaced by Local Development Frameworks (LDFs), consisting of a core strategy, proposals section, and area action plans. Local planning authorities should have an LDF in place by 2006.

This Local Plan has been prepared with the principles of a LDF in mind and will provide the land use policy context for the City area for up to three years following its adoption, pending preparation of the LDF.

Extract of those parts of the Local Plan's strategies and policies designed to reduce the need for travel by car and promote and encourage transport modes alternative to private motor vehicles are outlined below.

Strategic Objectives

'A City for Everyone'

1.7 - Providing employment opportunities in accessible locations, and enhancing transport provision.

'Town Centres at the Heart of Sustainable Communities'

1.15 - Developing town centres as 'hubs' in an integrated transport network.

'Improving Accessibility and Reducing Congestion'

1.21 - Making sure the land use aspects of the Local Transport Plan are fully reflected in the Local Plan.

- Integrating new developments with all forms of transport provision, and encouraging modal shift from the private car to other means of transport,
- Ensuring good public transport provision
- Ensuring NET is integrated with other forms of transport provision

Integration of Planning and Transport Policies ST4 a,b

b - Minimising new traffic generation, encouraging modal shift to more sustainable means of transport, and ensuring new development is adequately served by integrated transport measures, including cycling and walking.

Housing – Regeneration Zones and Mixed Use Sites H2 c

c - The accessibility of the site to public transport

Regeneration and Mixed Use - Regeneration Zones

- The Southside of the City Centre **MU2d**
- The Eastside of the City Centre **MU4d**
- The Waterside Area east of London Road **MU6e**

Shopping and Town Centres

Broadmarsh Centre S2

5.17 - Enable effective integration of the expanding Southside.

- Maximise the benefits of public transport infrastructure including the NET, planned improvements to the Midland Station, bus infrastructure & park & ride focused on Broad Marsh

Retail development on edge of or outside existing centres S5

Sports, Leisure, Entertainment and Arts Facilities R8 b,c

Proposed developments will be determined having regard to:

b - whether the site is accessible, or can be made accessible, by a choice of means of transport and without

i. causing a detrimental effect on the local highway network; and

ii. causing an unacceptable increase in traffic locally

c - whether the proposal would add significantly to the overall number and length of car trips

Recreation and Leisure R11e

Proposals must not

e - result in, or aggravate, traffic congestion, or cause a hazard to road safety.

Community, Health and Education CE1

a - the proposal being easily and safely accessible by a choice of means of transport, including public transport, cycling and walking

d - whether the proposal would cause congestion, and the amounts and times of this congestion

Built Environment

Layout and Community Safety BE2a,b,c

a - new streets within developments are direct and integrated to ensure easy access to neighbourhood centres and public transport

b - development does not generate levels or types of traffic… …which would have a materially detrimental effect on traffic congestion…

Creation of New Pedestrian Routes in the City Centre BE6

Transport

10.7 - The objectives the LTP will support are:

b - reduce traffic growth, encourage modal change away from the private car, particularly for work journeys to the City Centre

c - encourage safe walking and cycling for short journeys including travel to schools, shops and other local facilities

d - improve integration and interchange between modes

j - improve air quality within the Plan area and to alleviate other transport impact upon health

T1, T2 and T3 Policies

10.23 Major infrastructure proposals to improve City's overall transport network comprise:

- NET Line one, and proposals to develop future lines
- Major integrated transport improvement scheme for the Inner Ring Road to improve conditions for public transport, pedestrians and cyclists
- Major integrated transport scheme to improve conditions on the Ring Road
- Major transport interchange at the Midland Station.

T6 - Safeguarding of Nottingham Express Transit lines/routes

T7 - Developments must include provision for access by public transport

T8 - Safeguarding of Park & Ride sites

T9 - Safeguarding of proposals for public transport interchanges, stations, bus stop or passenger facilities

T10 Management of the Highway Network

T11 Cycling

T13 Freight

City Centre Transportation

T14 Traffic Management

T15 & T16 City Centre Car Parking

Appendix 2

The Development Strategy for Greater Nottingham 2004
(including Greater Nottingham Development Strategy delivery plan)

http://intra.nottinghamcity.gov.uk/des/our_strategies.asp

CONNECTIVITY – Physical, Digital and Cultural

1. Connections to markets – mobility with city and region.

Outcome

Development of a state-of-the art integrated transport system with:

- Successful delivery of the Government's Transport 2010 objectives
- Continued economic success and enhanced business competitiveness
- Better access to jobs and reduced deprivation and social exclusion in some of England's most deprived areas
- An exemplar model for new ways of working to deliver transport objectives
- Business and public satisfaction with transport performance

Relevant Targets

Strategic area:	**2010 Target and supporting local outcomes**
Mode share	• Motorised AM peak journeys to Inner Traffic Area • Car 63%, Bus and Rail (inc NET) 37%
Congestion reduction	• Area wide all day traffic growth • Limit to +2% on 2000/01 base
Bus and tram patronage	• +16% on 2000/01 base • Measured patronage increase on services developed/supported • Achievement of cost/passenger targets on services developed/supported
Walking and cycling	• Measured increase in activity levels • Increases in length of cycle route
Integration	• Increase in trips using more than one mode of transport
Accessibility relating to deprived wards	• Increase in accessibility index to employment and training opportunities
Satisfaction	• Increase in public satisfaction ratings • (76% in 2000/01)
% of development undertaken which is on Brown field land	• maintain % of development undertaken on non-greenfield land at level above national target

Current position

Nottingham is performing well against the scores given to the Annual Progress Report (incorporating measures of success in meeting local and national transport objectives, efficiency of delivery, consultation and monitoring). In fact, the 2002/3 Greater Nottingham Local Transport Plan Annual Progress Report, prepared jointly with the County Council, scored 87%, the top score in the country, and received a 'Well above average' rating.

Priorities for Action

The delivery plan will set out early gains in 2004/05 for making the most of the improved profile of Nottingham East Midlands Airport and the new express airport link bus service scheduled to commence in May 2004. Other components of our comprehensive transport investment programme will include:

Road

- Completing plans for the A453 link to the M1 and associated multi-modal packages.
- Improvements to City Gateways
- 4th River crossing planning, although this extends beyond the timescale of this plan.

NET

- Developing NET extensions to Clifton, and to QMC, the University, Beeston and Chilwell are expected to open in 2009/20010. The NET will link to an expanded network of Park and Ride sites around the conurbation
- Develop other longer term routes

Bus

- Expanded network of "link" and demand responsive services including new ring road commuter service
- Develop bus quality partnership principles into wider services across Nottingham

Rail

- A new transportation hub and interchange at the new station linking with the tram network will open up opportunity to expand the Southside business quarter. Major improvements to the Midland station are planned to create a 'state of the art' interchange. This will double the number of passengers the station can handle, radically improve passenger facilities and provide convenient interchange with NET, buses, cycles, taxis and cars. Demand will drive more rail services to and from the Station

- Improved rail links into new St Pancras international terminus improving connections to the continent

- Introduction of a direct Nottingham to Leeds service and improved rail services to Birmingham

- Commence introducing the South Notts Rail Network Review

- Promote the potential for a rail freight interchange at Toton.

Air

- Expand destinations served by Nottingham East Midlands Airport
- Developing the range of passenger catchments for Nottingham EMA and improving surface access to it, including development of a fixed public transport link
- Airport expansion and particularly growth of international freight hub unlocking opportunities for expansion of logistics based businesses.

ICT

- Ensuring that Broadband can be widely available at the right band width for potential users and that gaps in access can be plugged as rapidly as possible. The aim will be to achieve 100% Broadband enabled communities: WiFi'ed Malls , open space, cafe's and convention space in urban areas; wireless solutions to remote rural areas; High levels of access and use by business and public ; capable, innovative and well supported businesses, employees and public. The potential of “Wireless Clouds” to help deliver this will be explored as an early challenge.

- Promote use within transport sector in particular public transport information systems and transport telematics.

- Promote use in the visitor sector

Walking and Cycling

- Develop network of primary walking and cycling routes to stimulate regeneration and sustainable development

- New pedestrian/cycle crossing of the River Trent

Water

- Development of inland port

Integration

- Maximise the sustainable development of sites close to new/existing transport links
- Implementing the “Big Wheel” package and instigating further behaviour change in transport.
- Facilities to promote interchange between modes particularly within the City Centre and around the Ring Road
- Development of integrated transport ticketing initiatives.

Delivery Plan 2004/5

- Introduction of Nottingham to NEMA Skylink bus service
- Initiate primary pedestrian/cycle route programme linked to Regeneration areas
- Launch of Park & Ride ‘work link’ services and development of university and hospital link services
- Completion of Maid Marian Way improvements
- Completion of Chapel Bar pedestrianisation
- Commence detailed design of Midland Station Interchange to secure planning permission

Delivery Plan 2005+

- Implementation of LTP2 programme including promotion and awareness (Big Wheel)
- Implementation of Ring Road ‘link’ service
- Development of Ring Road interchanges
- Development of comprehensive electronic real-time public transport information
- Expansion onto Smartcards of integrated ticketing
- Improved pedestrian and cycle facilities on Lady Bay Bridge and feasibility work into further pedestrian and cycle linkages through extended strategic cycle network

- NET Lines 2&3
- Station Masterplan transport hub and interchange
- Extension of RHL to Bingham
- Development of fixed public transport link to NEMA
- Rolling programme of primary pedestrian route improvements
- Infrastructure development to promote sustainable and accessible regeneration

Appendix 3

Nottingham Local Transport Plan 2001/2-2005/6

‘The demand for travel is rising and needs to be accommodated in a sustainable way. The authorities have a good record of innovation and partnership working and have developed a successful Integrated Transport Strategy which was accepted and supported by the Government as the Greater Nottingham Package in 1995.

Our Vision comprises:

a) Sustainable communities

Sustainable communities are central to our strategy, aiming to make the area a safe, healthy and attractive place to live, and supporting existing communities. Strengthening local economies with less dependence on external supplies will help to minimise the need to travel and help to meet the Government's aspirations as set out in "Planning for the Communities of the Future."

Existing urban areas have the best developed options for travel choice and to be served by alternatives to the car. The problems of social exclusion, poverty and other forms of disadvantage require the broadening of opportunities and our priorities are to continue to develop attractive alternatives to the car for everyone.

A safe and healthy environment means safe streets which are well managed and maintained and are attractive places to live, particularly for vulnerable groups, and not dominated by the needs of the car. Pedestrians will be put first, with reduced traffic dominance the key. "Civilised Streets" will enhance community focus and prioritise local links.

b) Access for all

We aim for a top quality integrated public transport system with comprehensive coverage, frequent services with seamless and safe interchange between modes. Public transport users will receive priority over car drivers and public transport will be made an attractive alternative rather than the last resort. The authorities have launched a bid to become a "Centre of Excellence for Integrated Transport" and are committed to achieving the highest standards of alternatives to the car. Appropriate alternatives will specifically address the needs of people with disabilities including accessible buses, improvements to the pedestrian environment, a wheelchair accessible tram system together with audits and

action plans to tackle barriers which exclude people from work, leisure and residential opportunities. In the rural parts of the Plan area community transport schemes will be encouraged.

The public transport system will be an integrated network of high quality buses, trams, and trains with supporting park and ride infrastructure, promoted with extensive and effective publicity, marketing and public awareness measures.

The sustainable alternatives to the car will serve people's need to travel to work, to school, to shop and for leisure effectively, both during peak periods and at an appropriate level at off peak times.

Accessibility for necessary car journeys will be maintained and remain as a key element of the transport strategy. Travel demand management will be employed to make the costs and benefits of travel choice more explicit.

c) A conurbation which works

We seek to maintain and enhance the economic well being of the conurbation, promoting it as a competitive and attractive place to work and to invest in. We will be responsive to the needs of businesses and will maintain sensible and sustainable access for cars and freight. The City and district centres will remain at the heart of the Plan area's economic framework. Appropriate programmes of infrastructure investment and revenue support will be implemented, funded by a range of mechanisms. In the City area this will include a workplace parking levy with revenues invested in public transport and other sustainable alternatives to the car, and in improved maintenance of the highway, pedestrian and cycle networks with associated improvements for community safety.

We see the strengths of well developed and sustainable alternatives to the car as key to attracting inward investment; awareness of the direction of European and national legislation should signpost the informed investor to the Greater Nottingham area as being an attractive and sustainable location to invest in.

d) Establishing awareness

The costs associated with the need to travel and impact of the transport choices made by individuals and organisations will be made more apparent by a combination of national and local awareness raising actions.

We aim to develop an informed population, which supports the priorities established because they are aware of the relative environmental, health, economic and social consequences of choice and alternative modes of travel. Travel education and awareness will therefore be a major theme.

e) Fully integrated transport and land use planning framework for the conurbation

The new context of emerging legislation envisages that planning for our communities needs will become much better integrated; our vision is that the Greater Nottingham Local Transport Plan will form the basis for a comprehensive approach which flows both to and from the Regional Spatial Development Strategy, the Regional Transport Strategy and Structure and Local Plan reviews to provide a comprehensive framework for sustainable development which balances the environmental, economic and social demands of the population.'

Appendix 4 Monitoring Information

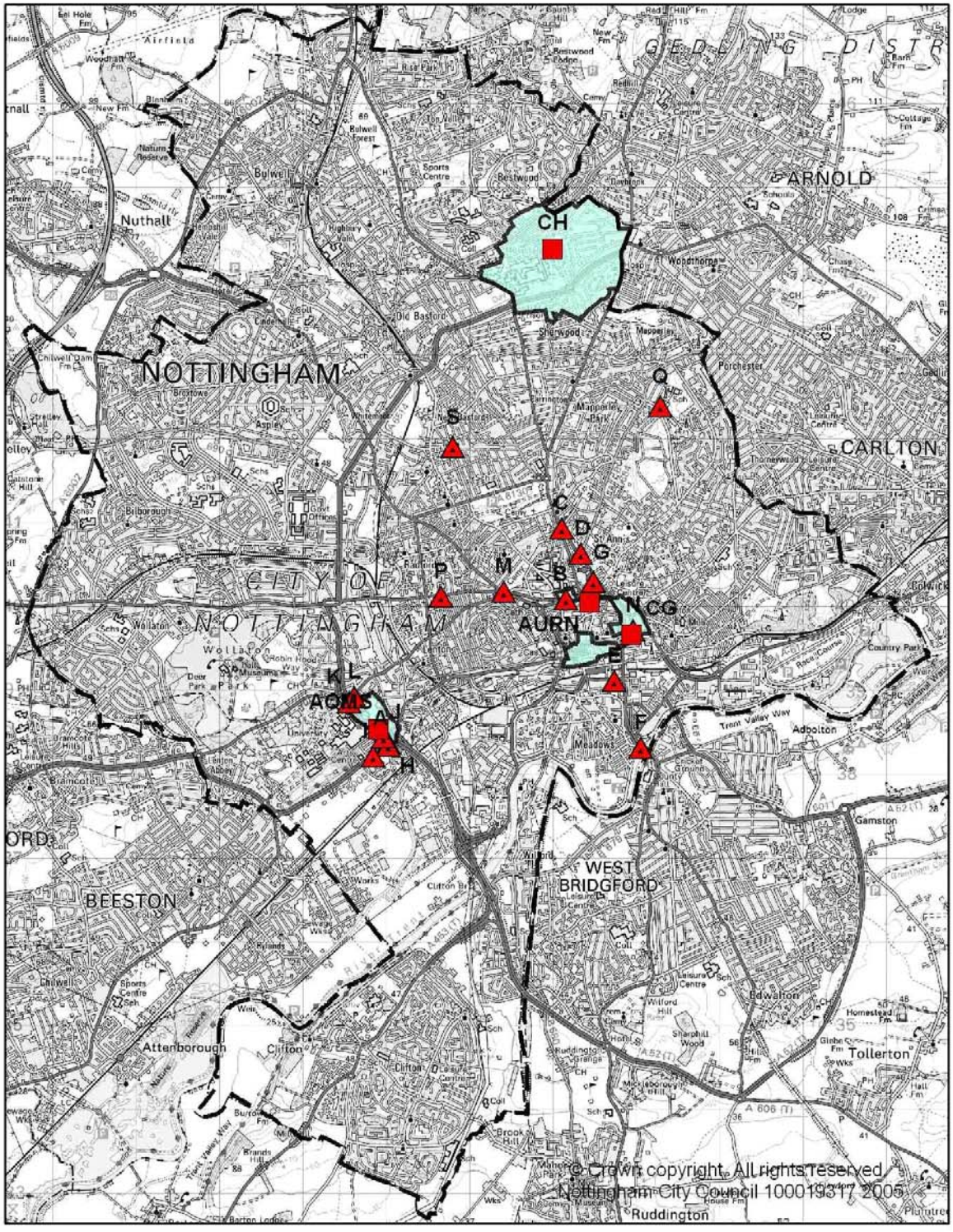
Table A4 -1 Monitoring Site Descriptions

Site Type	Monitor Type	Site Id	Location	OS Coordinates		Road to Tube Distance (m)	Tube to Receptor Distance (m)	Road to Receptor Distance (m)
Roadside	Diffusion tube	A	Beeston Road (1)	455024	338375	4	0	4
Roadside	Diffusion tube	B	Langtry's PH Upper Parl. St	457154	340095	4	0	4
Roadside	Diffusion tube	C	Mansfield Road (1)	457103	340944	4	0	4
Roadside	Diffusion tube	D	High Cross Woodboro' Rd.	457329	340643	2	0	2
Roadside	Diffusion tube	E	Selincourt Queen's Road	457729	339122	2	0	2
Roadside	Diffusion tube	F	Trent Bridge	458051	338328	5	0	5
Other	Diffusion tube	G	Perth Street	457479	340302	38	0	38
Roadside	Diffusion tube	H	Beeston Road (2)	455022	338348	1.1	2.9	4
Roadside	Diffusion tube	I	Beeston Road (3)	454843	338225	1.1	5.9	7
Roadside	Diffusion tube	J	Clifton Boulevard	454971	338455	1.1	11.9	13
Roadside	Diffusion tube	K	Derby Road A	454560	338868	7	10	17
Roadside	Diffusion tube	L	Derby Road B	454618	338933	4	38	25
Roadside	Diffusion tube	M	Canning Terrace	456411	340184	1.7	2.3	4
Roadside	Diffusion tube	N	The Castle PH Lower Parl. St.	457959	339730	1.1	2.9	4
Roadside	Diffusion tube (NS)	P	Ilkeston Road	455653	340126	6	0	6
Urban bkgd	Diffusion tube (NS)	Q	Ransom Drive	458287	342399	2	7	9
Urban bkgd	Diffusion tube (NS)	S	Noel Street Baths	455795	341911	264	24	240
						Road to site (m)		
Urban Centre	Continuous	AURN	AURN Clinton St E	457437	340049	35	-	-
Roadside	Continuous	CG	Carter Gate	457946	339668	5	-	-
Other	Continuous	AQMS	AQMS QMC	454907	338548	23	-	-
						Site to Chimney (m)		
Other	Continuous	CH	City Hospital Edwards Lane	456999	344266	31	-	-

NS = sites are part of the national NO_2 network

The maps overleaf, Figures A4-1 to A4 – 4 show the geographical locations of the monitoring sites and the extent of the AQMAs

Figure A4-1 Nottingham City Council Monitoring Sites & Air Quality Management Areas



Key

- Diffusion Tube
- Continuous Analysers
- Air Quality Management Areas
- City Boundary

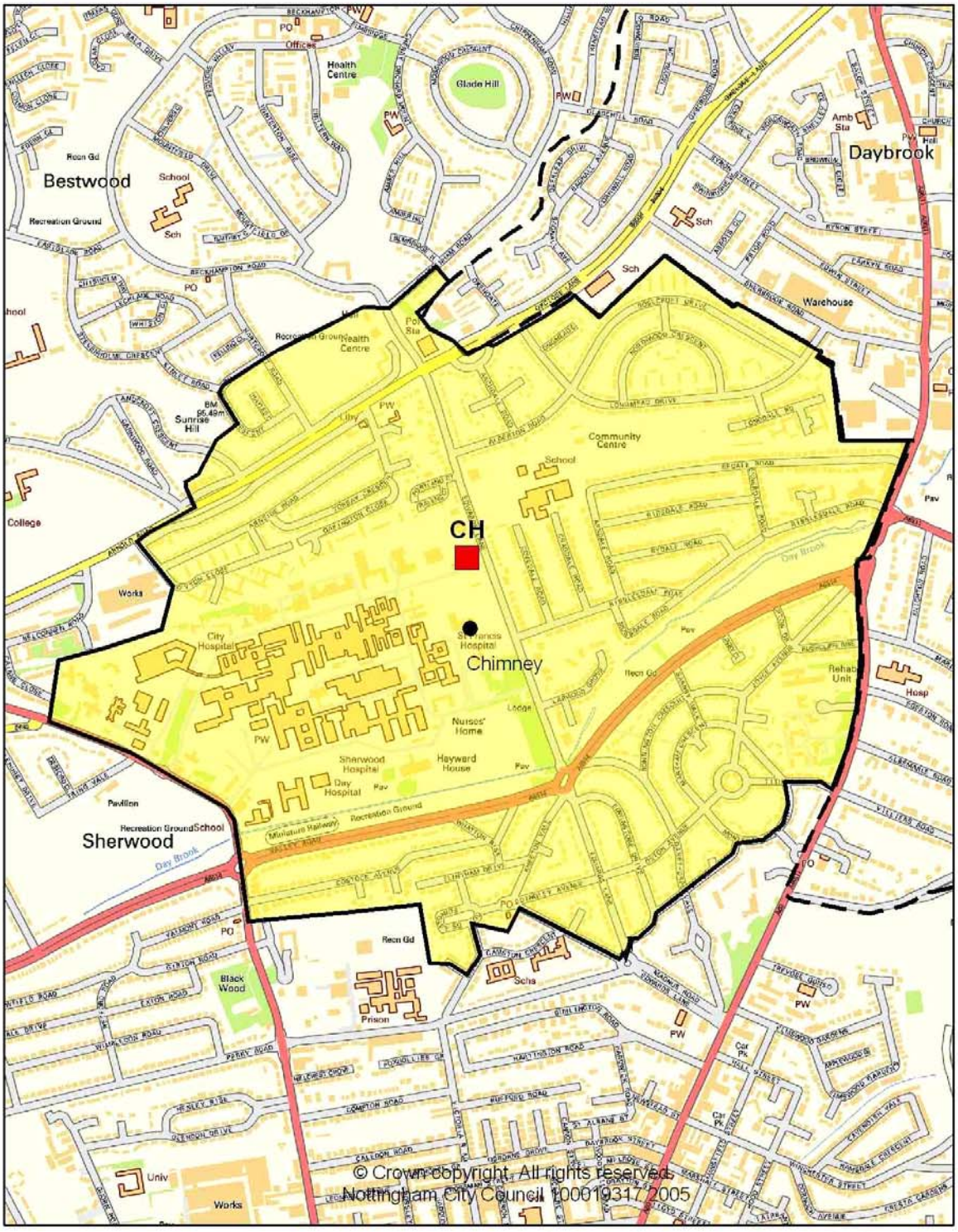
0 1 2 3 4 Kilometres

City of NOTTINGHAM
City Development
Pollution Control Section

N

Scale : 1:66000
Drawn : DJH/JA
Date : April 2005

Figure A4-2 Monitoring Site within Nottingham No:1 Air Quality Management Area - Sulphur Dioxide



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Nottingham City Council 100019317 2005

Figure A4-3 Monitoring Sites within and near Nottingham No:2 Air Quality Management Area - Nitrogen Dioxide

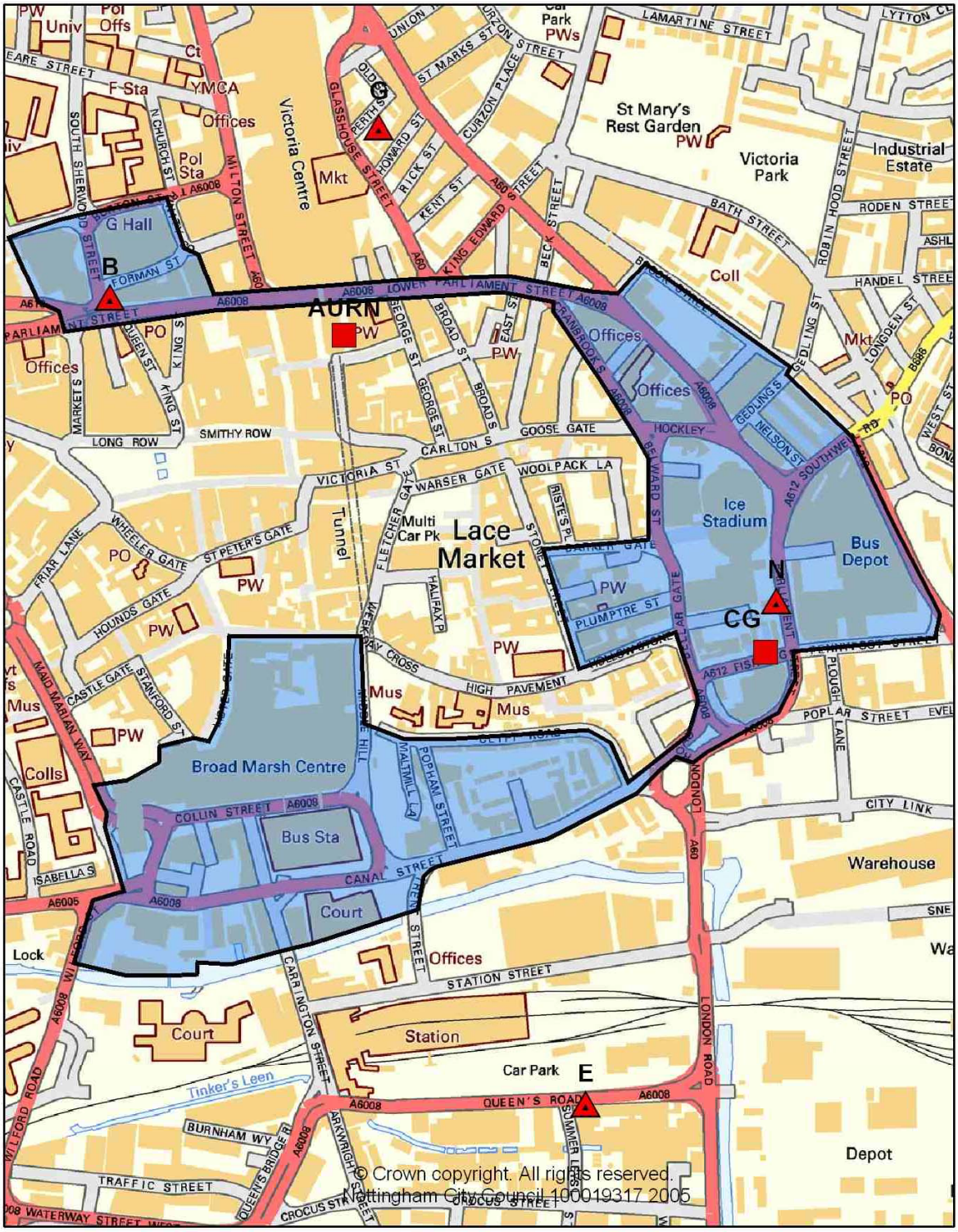
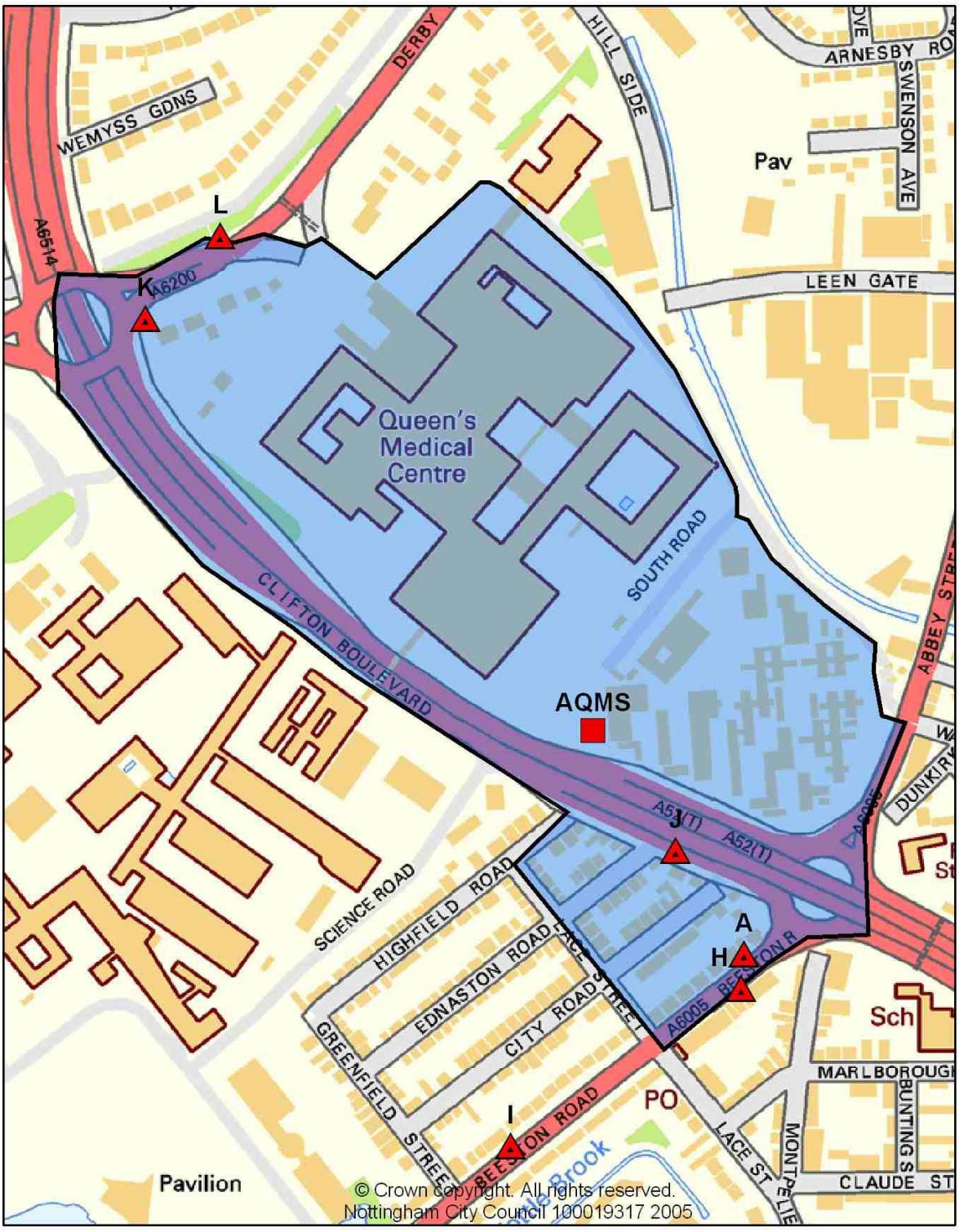


Figure A4-4 Monitoring Sites within and near Nottingham No:3 Air Quality Management Area - Nitrogen Dioxide



Bias Correction of Nitrogen Dioxide Diffusion Tube Data

Bias Adjustment factor

A co-location study of triplicate diffusion tubes at each of the three sites that monitor nitrogen dioxide continuously was carried out between May 2004 and February 2005 (10 months). Tubes were exposed for monthly periods.

The monthly concentrations were put into a spreadsheet supplied by NETCEN. The spreadsheet calculates the tube bias, accuracy and precision of the results as well as the bias adjustment factor. However it is still under development so only the average precision and the bias adjustment factors are shown in Table A4-2, page 52

The underlying calculation of the bias adjustment factor in the spreadsheet is the same as that given in LAQM.TG (3) i.e.

Bias adjustment factor A = Cm /Dm

Where Cm = annual mean chemiluminesence concentration
Dm = annual mean diffusion tube concentration

In accordance with LAQM.TG (3) Box 6.4 because there is less than 12 months data, the ‘Cm’ mean and ‘Dm’ mean cover the same period i.e.10 months.

A bias adjustment factor was derived for each site and then averaged to give a single value. The averaged bias adjustment factor A = 0.818 was applied to the diffusion tube nitrogen dioxide concentrations at all the other sites. Table 8 in the main text shows the biased and unbiased concentrations.

This approach was used because the three study sites I.e. AURN, AQMS and CG respectively represent urban background, other and roadside locations and are consistent with the rest of Nottingham City’s diffusion tube sites. Also for some sites it would be difficult to determine which of the bias adjustment factors to use.

Table A4 - 2 Bias Adjustment Factor Details

	Cm (10 mths) NO_2 μgm^{-3}	Dm (10 mths) NO_2 μgm^{-3}	Bias Adjustment Factor, A	Data Capture (10 mths) %	Precision (CoV) %
AURN	34	45	0.760	96	4
AQMS	34	40	0.859	92	8
CG	44	53	0.836	95	9
Averaged Bias adjustment factor, A	-	-	0.818	-	-

CoV = coefficient of variation

Nitrogen Dioxide Diffusion Tube and QA/QC Information

Nottingham City Council's diffusion tubes are supplied and analysed by Casella CRE Air. The tubes are prepared using a 10% solution of TEA (triethanolamine) in de-ionised water. The tubes are exposed on site for one month before being returned for laboratory analysis.

The laboratory is UKAS accredited and is required to take part in other proficiency schemes. Casella participate in a number of QA/QC monitoring systems to demonstrate satisfactory performance:

- The Workplace Analysis Scheme for Proficiency (WASP) programme to ensure uniformity in data throughout the year. Only laboratories that are in the WASP scheme are used for analysing tubes from the National Nitrogen Dioxide Diffusion Tube Network. The scheme is operated by HSL
- The monthly field inter-comparison exercise with other laboratories to enable assessment of bias and precision undertaken by HSL on behalf of NETCEN.
- An external QC scheme to check solutions run by NETCEN.

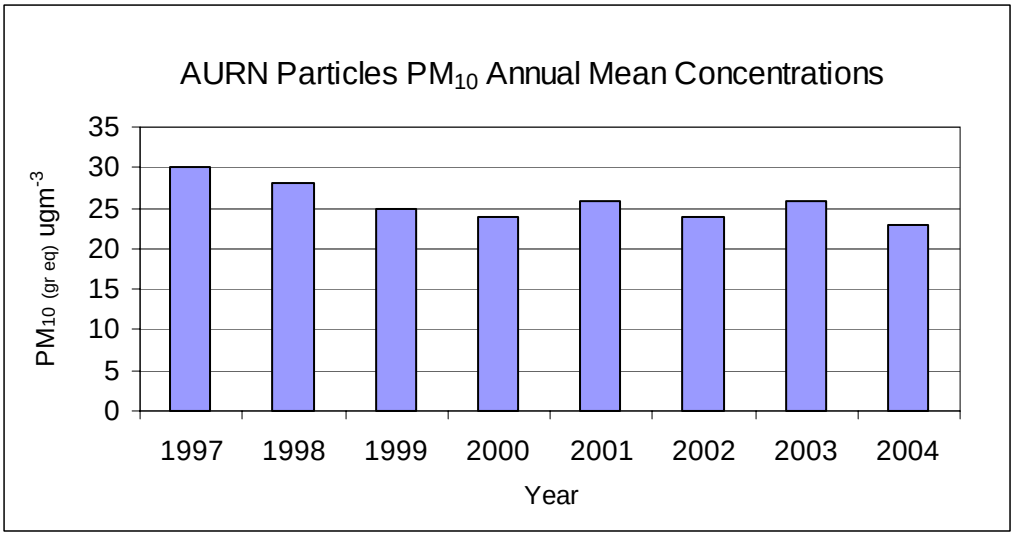
See Nottingham City Council's Second and Third Stage Review and Assessment 2001 - Technical Annexe for further information on diffusion tubes and the QA/QC procedures used.

http://www.nottinghamcity.gov.uk/airqualitystrategy.pdf

Pollutant Trend Data

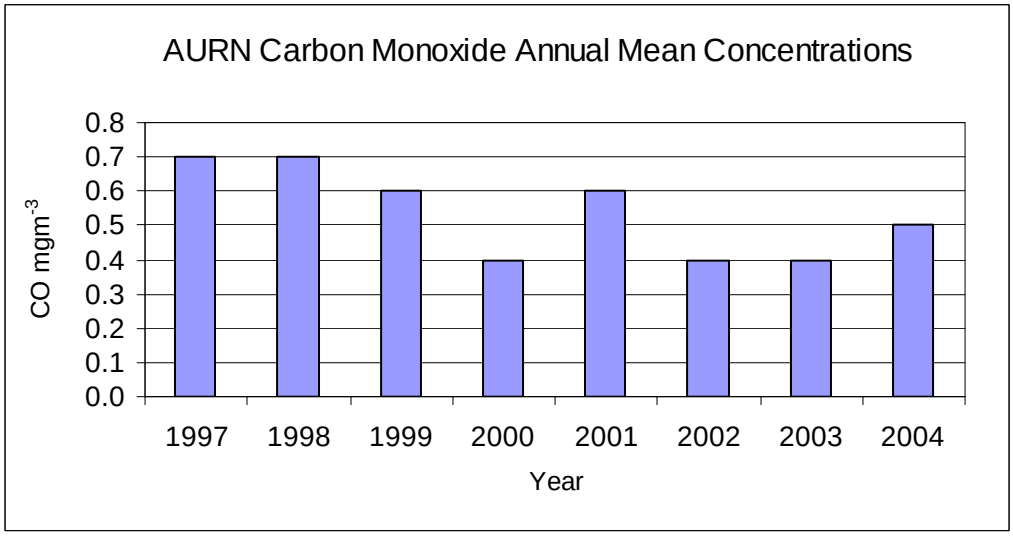
1997 to 2004 Annual Means at the AURN, Clinton St. East, City Centre

Figure A4 - 5



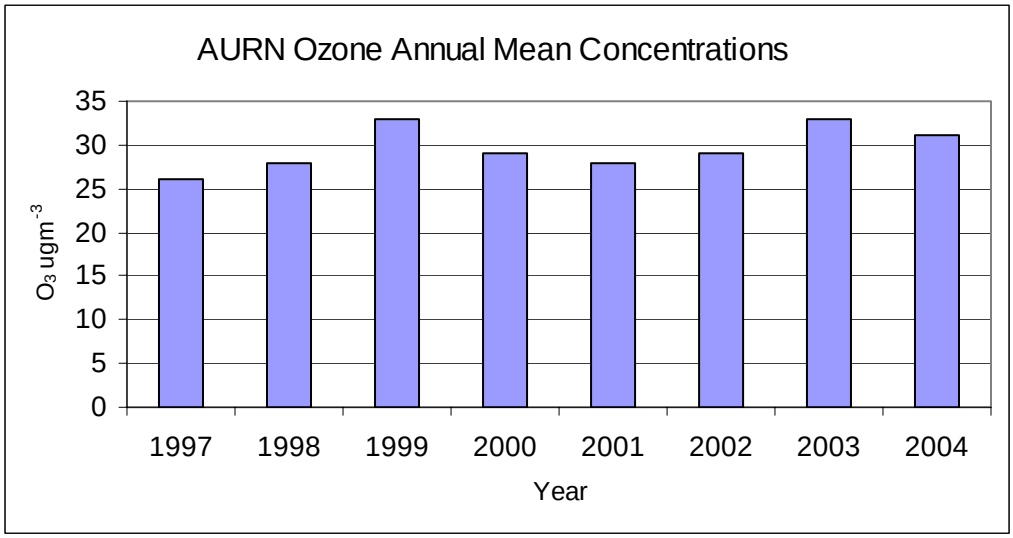
Since 1999 PM_{10} concentrations have remained at a similar level and considerably below the annual mean objective of 40 μgm^{-3}.

Figure A4 - 6



Levels have always been low at this site mainly because it is not near the primary carbon monoxide source i.e. vehicle exhausts. Compared to 1997 there has been a reduction in CO levels in recent years

Figure A4 – 7



Ozone is not covered by the Air Quality (England) Regulations 2000 (as amended). However the annual mean levels have been included to allow comparison with the other pollutants and national trend data. From the above it can be seen that ozone levels have been higher in the last two years compared with 1997 and 1998 and also that there are no extreme year on year variations.