

2010 Air Quality Progress Report for Nottingham City Council

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

October 2010

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Executive Summary

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. All local authorities are required to regularly review and assess air quality in their areas, and to determine whether or not specified air quality objectives are likely to be achieved.

The air quality objectives applicable to the Local Air Quality Management process in England are set out in the Air Quality (England) Regulations 2000 (SI 928) and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043).

This Progress Report gives information about the most recent annual monitoring results and whether there have been new local developments and/or planning applications that may impact on air quality. The air quality aspects of the Local Transport Plan along with the implementation of the associated action plan have also been considered.

During 2009 pollutant levels were measured, using automatic (continuous) and non-automatic monitoring, at a number of sites within the Nottingham City area.

The monitoring results showed that no exceedences of the air quality objectives for PM_{10}, sulphur dioxide, carbon monoxide and benzene were measured.

The annual mean air quality objective for nitrogen dioxide is 40 $\mu g/m^3$; levels in excess of this were measured at the 2 roadside automatic monitoring sites and at a number of nitrogen dioxide diffusion tube sites - all of which are within the Nottingham No.2 and No.3. Air Quality Management Areas 2010.

The 1-hour objective for nitrogen dioxide (200 $\mu g/m^3$ - not to be exceeded more than 18 times a year) was not exceeded.

No new local developments i.e. road traffic sources, industrial sources, commercial/domestic sources, residential and commercial sources or new planning applications that are likely to have an adverse air quality impact have been identified.

The potential increasing use of biomass in the industrial and domestic sector may have an impact on local air quality. A more detailed consideration of this may be needed in future reports.

There has been significant progress on a number of measures that are in the Local Transport Plan 2 Air Quality Action Plan - schemes such as Parksmart -variable message signing and zonal car park direction signing system; Big Track – off-road circular cycle route via the City Centre and; the Statutory Bus Quality Partnership have all been completed and are operational.

The proposed NET(Nottingham Express Transit) Phase 2 of the tram network has the potential to impact positively on air quality once the lines are in use. However final approval for the scheme to go ahead has not yet been given.

From the 2009 monitoring results and the other information presented in this report it is concluded that there is no need to progress to a Detailed Assessment for any of the regulated pollutants.

Table of contents

1 Introduction 8

1.1 Description of Local Authority Area 8

1.2 Purpose of Progress Report 8

1.3 Air Quality Objectives 9

1.4 Summary of Previous Review and Assessments 11

2 New Monitoring Data 15

2.1 Summary of Monitoring Undertaken 15

2.2 Comparison of Monitoring Results with Air Quality Objectives 23

3 New Local Developments 40

4 Local / Regional Air Quality Strategy 41

5 Planning Applications 42

6 Air Quality Planning Policies 42

7 Local Transport Plans and Strategies 47

8 Climate Change Strategies 50

9 Implementation of Action Plans 52

10 Conclusions and Proposed Actions 61

10.1 Conclusions from New Monitoring Data 61

10.2 Conclusions relating to New Local Developments 61

10.3 Other Conclusions 61

10.4 Proposed Actions 62

11 References 64

Appendix A NO_2 Diffusion Tube and PM_{10} Data Adjustment and QA/QC Information 67

A-1 NO_2 Diffusion Tube Bias Adjustment 68

A-2 PM_{10} Data Adjustment 70

A-3 QA/QC for Automatic Monitoring 73

A-4 QA/QC for NO_2 Diffusion Tube Monitoring 74

Appendix B Monthly Diffusion Tube Data 78

List of Tables

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England. 10

Table 1.2 Previous Review and Assessment Reports 11

Table 2.1 Details of Automatic Monitoring Sites 18

Table 2.2 Details of Non-Automatic Monitoring Sites 21

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective 24

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective 26

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes 27

Table 2.5a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective 31

Table 2.5b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective 31

Table 2.5c Results of $PM_{2.5}$ Automatic Monitoring 32

Table 2.6 Results of SO_2 Automatic Monitoring: Comparison with Objectives 34

Table 2.7 Results of Benzene Pumped Tube Monitoring: Annual Mean 35

Table 2.8 Results of CO Automatic Monitoring: Comparison with Running 8-hour Mean Objective 36

Table 7.1 Local Transport Plan 2006/07-2010/11 - Local Indicators linked to Air Quality Action Plan Measures 48

Table 9.1a Action Plan Progress - City Centre Air Quality Management Area Action Plan Update June 2010 52

Table 9.1b Action Plan Progress – Ring Road (Dunkirk) Air Quality Management Area Action Plan Update June 2010 57

Appendix A

Table A-1 Nottingham City Council's Bias Adjustment Factor 68

Table A-2 Gradko 2009 WASP NO_2 Diffusion Tube Performance Results 75

Table A-3 2009 Gradko/AEA Energy & Environment Intercomparison NO_2 Diffusion Tube Network 77

Appendix B

Table B-1 2009 Diffusion Tube Unbiased Monthly NO_2 Concentrations 78

List of Figures

Figure 1.1 Map of Air Quality Management Areas Boundaries 14

Figure 2.1 Map of 2009 Automatic Monitoring Sites 17

Figure 2.2 Map of Non-Automatic Monitoring – Diffusion Tube Sites 20

Figure 2.3A AURN Nitrogen Dioxide Annual Mean Concentrations 1998-2009 25
Figure 2.3B CG NOx Nitrogen Dioxide Annual Mean Concentrations 2005-2009 25
Figure 2.3C AQMS Nitrogen Dioxide Annual Mean Concentrations 2002-2009 26
Figure 2.4A City Centre Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations 1997-2009 28
Figure 2.4B Dunkirk Area Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations 2005-2009 Beeston Road 29
Figure 2.5A AURN Particles, PM_{10} Annual Mean Concentrations 1997-2008 32
Figure 2.5B AQMS Particles, PM_{10} Annual Mean Concentrations 2002-2009 33
Figure 2.6A AURN Sulphur Dioxide Annual Mean Concentrations 1997-2009 34
Figure 2.6B AQMS Sulphur Dioxide Annual Mean Concentrations 2002-2009 34
Figure 2.7 AURN Benzene Annual Mean Concentrations 2002-2009 35
Figure 2.8A AURN Carbon Monoxide Annual Mean Concentrations 1997-2009 36
Figure 2.8B AQMS Carbon Monoxide Annual Mean Concentrations 2002-2009 37
Figure 2.9A AURN Annual Mean of Daily Maximum 8 Hour Ozone Concentrations 1997-2009 38
Figure 2.9B AQMS Annual Mean of Daily Maximum 8 Hour Ozone Concentrations 1997-2009 38
Figure A-1 Flow chart describing Data Manipulation in the VCM Web Portal 71

1 Introduction

1.1 Description of Local Authority Area

The City of Nottingham covers an area of 7,470 hectares and has a population of approximately 288,700 (Key Facts, 2009). The City boundaries contain urban residential, suburban residential, commercial and industrial areas, and an area of large suburban parkland.

Geographically the Nottingham City area is made up of the River Trent valley basin which extends outside the City's southern boundary to Rushcliffe Borough Council and southwest to Broxtowe Borough Council. Whilst to the north of the river the land rises to form a ridge running from the south west near Lenton north east to Mapperley. North and north-west of this ridge the land forms a large basin through which the River Leen flows.

Throughout the 18th and early 19th Centuries the City was dominated by the textile industry which has reduced significantly. Industry is now diverse ranging from some heavy industry through to biotechnology. Currently the Council regulates, 1 Part A2 and 70 Part B 'permitted installations' under the Pollution Prevention and Control Act 1999. There are 11 Part A1 installations permitted by the Environment Agency. The whole of the City is subject to Smoke Control Orders, the smoke control programme having been completed in 1991.

Nottingham is a major centre of commerce in the East Midlands, this together with the A453, A610 and A52 road links to the M1 and A1 results in large volumes of traffic entering the City via a number of primary arterial routes. Significant numbers of people commute into the city for work, and visit for tourism, leisure and entertainment. The city also has two universities with over 55,000 students.

The City Centre is mainly retail and service sector/office use with two large shopping centres; Victoria Centre and Broadmarsh to the north and south respectively, each of which has a bus station. The centres are connected by busy pedestrianised areas. The railway station is located approximately 200 metres south of the Broadmarsh bus station.

The Tram (Light Rapid Transit System) links the transport centres with the northern suburbs and 'park and ride' sites providing an integrated transport system.

In Nottingham City Council's area road traffic is the principal source of the air pollutants to which the Air Quality objectives cited in the Air Quality (England) Regulations 2000 (SI 928) apply. Industrial sources also contribute, but to a lesser degree.

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 exceedence of 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 micrograms per cubic metre $\mu g/m^3$ (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 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/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 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/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

Table 1.2 below gives details of the previous rounds of Review and Assessment (R&A) and a brief outline of the conclusions of the reports.

Table 1.2 Previous Review and Assessment Reports

Title	Date	Outcome	**AQMA Declared/ Revoked?** (Date of AQMA Orders)
City of Nottingham Air Quality Review & Assessment First & Second Stage	April 2000	Third stage assessment for sulphur dioxide, nitrogen dioxide and particulates,PM_{10} necessary. No further assessment of 1,3 Butadiene, benzene, carbon monoxide and lead required.	-
City of Nottingham Air Quality Review & Assessment Second & Third Stage Report	Sept 2001	Areas of the city where unlikely to meet air quality objectives for nitrogen dioxide or sulphur dioxide. Proposed 1 AQMA for SO_2 and 2 AQMAs for NO_2	**Declared** AQMA No:1 (Sulphur dioxide) (2002) AQMA No:2 (Nitrogen dioxide) (2002) AQMA No:3 (Nitrogen dioxide) (2002)
City of Nottingham Local Air Quality Management Stage Four Review & Assessment of Nottingham's Air Quality Management Areas	July 2003	Determined that AQOs for sulphur dioxide – hospital chimney and nitrogen dioxide – traffic sources, unlikely to be exceeded by 'due dates' therefore no Air Quality Action Plans needed	-
City of Nottingham Local Air Quality Management Updating and Screening Assessment	October 2003	Necessary to proceed to a Detailed Review and Assessment for nitrogen dioxide with respect to a number of roads and for sulphur dioxide in the vicinity of the Nottingham Main-line Station.	-

Title	Date	Outcome	**AQMA Declared/ Revoked?** (Date of AQMA Orders)
City of Nottingham Local Air Quality Management Detailed Assessment	August 2004	Sulphur dioxide 15-minute mean AQO likely to be met at locations of 'relevant exposure' at Nottingham Mainline Station. Nitrogen dioxide annual mean AQO likely to be met. Concluded insufficient monitoring data available to allow revocation of any of the AQMAs.	-
City of Nottingham Local Air Quality Management Progress Report	April 2005	Concluded that SO_2 monitoring data sufficient to propose revocation of AQMA No:1 (Sulphur dioxide). Necessary to maintain AQMAs No 2 & 3 (nitrogen dioxide)	-
Nottingham City Council Local Air Quality Management Updating and Screening Assessment:	June 2006	Necessary to proceed to a Detailed Assessment for PM_{10} for 2 roads in the city centre and for nitrogen dioxide for a number of roads and junctions based on guidance criteria and some diffusion tube data. AQMA No:1 (Sulphur dioxide) to be revoked - agreed by Defra	**Revoked** AQMA No:1 2002 (Sulphur dioxide) (5 April 2007)
Nottingham City Council Local Air Quality Management Detailed Assessment Consultation Document	May 2008	Conclusion that no further action required for PM_{10} accepted by Defra **Proposed amendments to existing AQMAs No.2 & No.3 for nitrogen dioxide.** **Further work for nitrogen dioxide being undertaken following comment and assessment by Defra** (see DA 2008 – Annex 1 below)	-

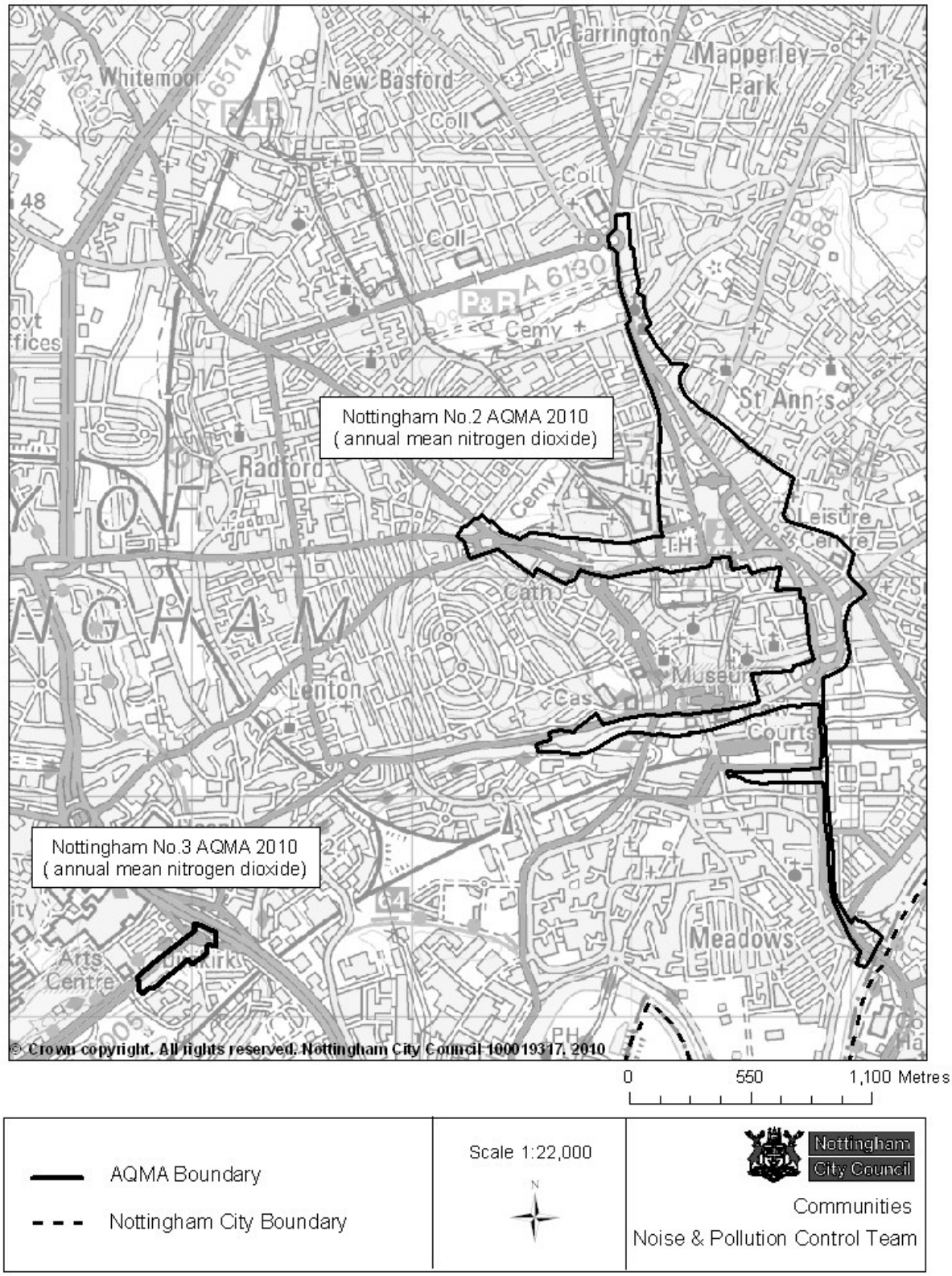
Title	Date	Outcome	**AQMA Declared/ Revoked?** (Date of AQMA Orders)
Nottingham City Council Local Air Quality Management Progress Report	July 2008	Concluded that there was no need to undertake a further detailed assessment - accepted by Defra	-
2009 Air Quality Updating and Screening Assessment for Nottingham City Council	April 2009	Concluded that there was no need to undertake an additional detailed assessment because all areas of potential exceedence are being considered in the revised DA May 2008 - accepted by Defra	
Nottingham City Council Local Air Quality Management Detailed Assessment 2008 Annex 1 - Supplementary Information for Nitrogen Dioxide	October 2009	Confirmed the DA May 2008 findings - **need for amended AQMAs for annual mean NO_2.** Accepted by Defra on 31 December 2009. Consultation and declaration of amended AQMAs to be completed by 30 April 2010	-
Nottingham City Council Local Air Quality Management Detailed Assessment 2009	January 2010	For clarification this is a consolidated report of DA May 2008 PM_{10} findings and DA 2008 Annex 1 NO_2 findings. Outcomes are as for the individual reports given above	**Declared** AQMA No:2 2010 (nitrogen dioxide) AQMA No:3 2010 (nitrogen dioxide) By AQMA Variation Orders dated 22 June 2010

AQMA = Air Quality Management Area AQO= Air Quality Objective DA= Detailed Assessment NO_2 = nitrogen dioxide SO_2 = sulphur dioxide PM_{10} = particles

All reports are available on Nottingham City Council's internet site: http://www.nottinghamcity.gov.uk

Nottingham AQMAs No.2 and No.3 2010 are shown on the map - next page Figure 1.1.

Figure 1.1 Map of Air Quality Management Areas Boundaries



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Nottingham City Council undertakes continuous monitoring at a number of locations in its area and Defra have an Automatic Urban and Rural Network (AURN) site in the city centre. Figure 2.1 is a map showing the locations of the continuous monitoring sites.

AURN, Clinton Street East

The AURN station is located in the city centre and classified as an 'Urban centre' site. The surrounding area comprises retail outlets and city centre business premises in an urban pedestrianised area. The nearest road, the A6008, approximately 30 metres from the site, is no longer a major through-route following completion of the City Centre Major Scheme to divert and redirect traffic around the City Centre and limit access to certain vehicles types such as buses. Relevant exposure is at residential properties approximately 40 metres to the south and approximately 23 metres to the north east 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 nitric oxide (NO), nitrogen dioxide (NO_2), oxides of nitrogen (NOx), particles ($PM_{2.5}$), sulphur dioxide (SO_2) and ozone (O_3). Benzene is measured using continuous pumped diffusion tubes.

Particles, PM_{10} was measured from site initiation in 1996 until December 2008. No measurements were undertaken in 2009 however PM_{10} measurement was re-started in 2010.

Carter Gate NOx (CG NOx), Carter Gate, City Centre

This unit has been located at Carter Gate monitoring NOx since December 2003 and monitoring SO_2 between May 2007 and December 2009. The site is a suburban mixed commercial/residential area of the City adjacent to the A60. It is approximately 10 metres from the A60 which is a major traffic route and approximately 3 metres from a busy B road and is classed as a 'Roadside' site. There are residential properties approximately 12 metres from the unit and 8 metres away from the A60.

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. The site also measures SO_2 using a continuous analyser.

Air Quality Monitoring Station (AQMS), Queens Medical Centre (QMC), Clifton Boulevard, Dunkirk

The AQMS station has been in its current location at the QMC hospital since March 2002. It is 25 metres from the A52 ring road and approximately 5 metres from a minor

service road and, is classed as an 'Other' site. It is in a suburban, mixed industrial/commercial/residential area of the City and is approximately 11 metres from the nearest relevant exposure.

The self-contained, air-conditioned station has a sampling inlet approximately 2.5 metres high and has continuous automatic analysers that measure NO, NO_2, NOx, PM_{10}, SO_2, CO and O_3.

Lace Street NOx (LS NOx), Lace Street, Dunkirk

This is a fixed unit located at Lace Street since March 2007. The site is a suburban, mixed commercial/residential area of the City adjacent to the A6005, a busy road traffic route. It is approximately 4 metres from the A6005 and 1 metre from a minor road and is classed as a 'Roadside' site. The unit is sited on the pavement at the boundary with a residential property.

The sampling inlet for the self-contained, air-conditioned enclosure is approximately 1.5 metres high. NO, NO_2 and NOx are measured using a continuous automatic analyser.

The following information for the automatic monitoring sites is given in Appendix A

- details of the correction applied to the PM_{10} monitoring data using the Volatile Correction Model (VCM)

- details of quality assurance and quality control (QA/QC).

Figure 2.1 Map of 2009 Automatic Monitoring Sites

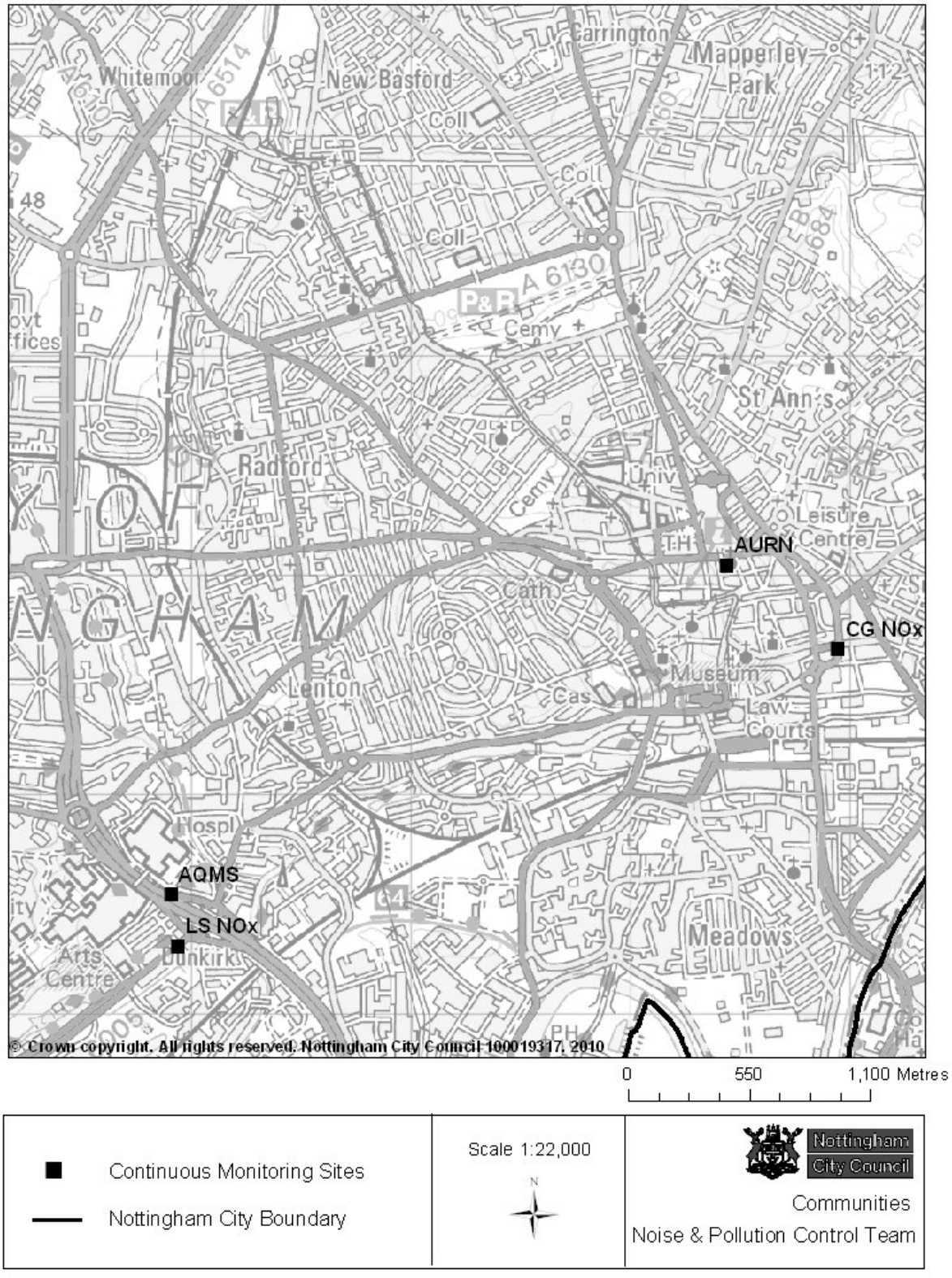


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road	Does this location represent worst-case exposure?
AURN Clinton St East.	Urban Centre	X 457437	Y340049	$PM_{2.5}$	FDMS	N	Y (0m)	35m	N
				PM_{10}	FDMS				
				NO_2, NO, NOx,	Chemi-luminescence				
				O_3	Ultra Violet Absorption (UVA)				
				SO_2	Ultra Violet Fluorescence (UVF)				
CG NOx Carter Gate	Roadside	X 457946	Y339668	NO_2, NO, NOx,	Chemi-luminescence	Y	Y (12m)	4m	Y
				SO_2	UVF				
AQMS Clifton Boulevard	Other	X 454907	Y338548	PM_{10}	TEOM	Y	Y (11m)	9m (main rd.) 2m (minor rd.)	N
				NO_2, NO, NOx	Chemi-luminescence				
				O_3	UVA				
				SO_2	UVF				
				CO	Infra-Red Absorption				
LS NOx Lace St.	Roadside	X 454941	Y338315	NO_2, NO, NOx,	Chemi-luminescence	Y	Y (0m)	9m (main rd.) 1m (minor rd.)	Y

2.1.2 Non-Automatic Monitoring

Nitrogen Dioxide (NO_2) Diffusion Tube Monitoring

Nottingham City has diffusion tubes sited at a number of locations including tubes co-located with continuous monitors at the AURN, CG NOx and LS NOx sites. Tubes have been exposed in and near AQMAs No.2 and 3 and in other areas where there may be 'hot spots' due to road and/or traffic changes.

Most of the tubes are placed on building façades of residential properties at sites mainly classified as 'roadside'; two sites are 'urban background'. The tubes are exposed for a month before being sent for laboratory analysis.

The geographical locations of the tube sites are shown in Figure 2.2.

See Appendix A for:

- details of the tube type and the laboratory that supplies and analyses the tubes
- details of the bias adjustment factor that has been applied to the annual mean NO_2 diffusion tube data.
- details of Nottingham City Council's diffusion tube and continuous monitoring 2009 co-location study including comparison with the reference method.
- details of diffusion tube QA/QC.

Benzene Pumped Tube Monitoring

Benzene is measured at the AURN, as part of the Non-Automatic Hydrocarbon Network, using a controlled flow pumped tube sampler. The 2 tubes are changed every two weeks and returned to the National Physics Laboratory (NPL) for analysis.

The equipment is audited twice a year by NPL. The sample flow is calibrated and adjusted as required; the system is leak checked and preventative maintenance performed.

The geographical location of the AURN site is shown in Figure 2.1.

Figure 2.2 Map of Non-Automatic Monitoring - Diffusion Tube Sites

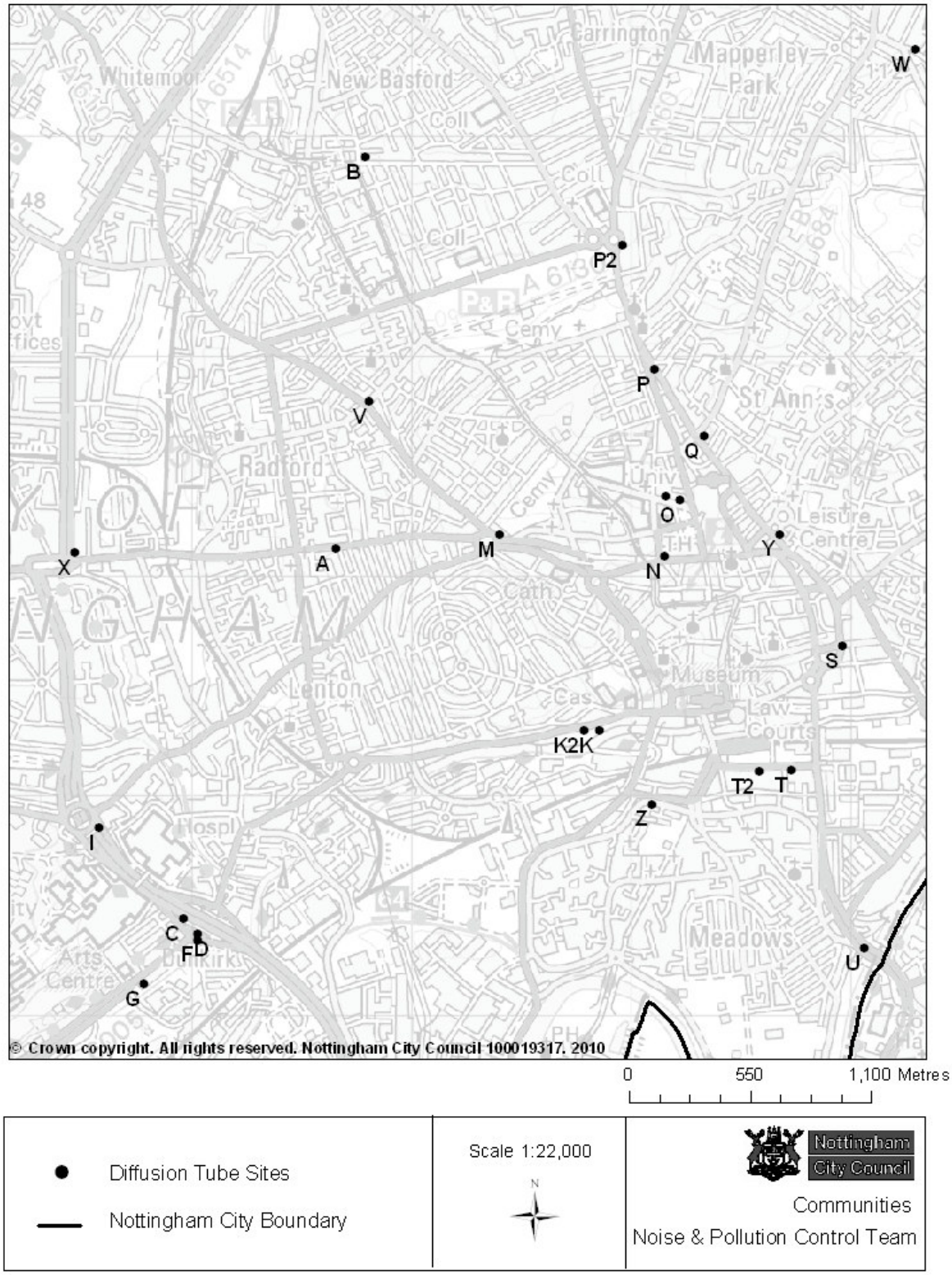


Table 2.2 Details of Non-Automatic Monitoring Sites

Site Id & Street		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?
Diffusion Tubes									
C	Clifton Boulevard	R	X454963	Y338447	NO_2	N	Y (0m)	13m	Y
D	Beeston Road (1)	R	X455024	Y338375	NO_2	Y	Y (0m)	4m	Y
F	Beeston Road (2)	R	X455028	Y338349	NO_2	N	Y (0m)	4m	Y
G	Beeston Road (4)	R	X454782	Y338146	NO_2	N	Y (0m)	9m	Y
I	Derby Road (1)	R	X454577	Y338860	NO_2	N	Y (0m)	25m	Y
X	Western Blvd.	R	X454466	Y340111	NO_2	N	Y (0m)	16m	Y
K	Castle Blvd.	R	X456852	Y339303	NO_2	Y	Y (0m)	4m	Y
K2	Castle Blvd. (2)	R	X456781	Y339303	NO_2	Y	Y (0m)	4m	Y
M	Canning Terrace	R	X456399	Y340191	NO_2	Y	Y (0m)	4m	Y
N	Up. Parliament. St.	R	X457154	Y340095	NO_2	Y	Y (0m)	4m	Y
O	Shakespeare St.	R	X457221	Y340351	NO_2	Y	Y (0m)	2m	Y
O2	Shakespeare St	R	X457157	Y340367	NO_2	Y	Y (0m)	3m	Y
P	Mansfield Road	R	X457103	Y340944	NO_2	Y	Y (0m)	4m	Y
P2	Mansfield Rd (2)	R	X456961	Y341507	NO_2	Y	Y (0m)	16m	Y
Q	Woodborough Rd	R	X457329	Y340643	NO_2	Y	Y (0m)	2m	Y
Y	Beck Street.	R	X457673	Y340194	NO_2	Y	Y (0m)	3m	Y
S	Carter Gate	R	X457961	Y339687	NO_2	Y	Y (0m)	7m	Y
T	Queen's Road	R	X457729	Y339122	NO_2	Y	Y (0m)	2m	Y
T2	Queen's Rd (2)	R	X457582	Y339114	NO_2	Y	Y (0m)	2m	Y
Z	Kinglake Place	R	X457089	Y338966	NO_2	N	Y (0m)	4m	Y
U	Trent Bridge	R	X458051	Y338328	NO_2	Y	Y (0m)	5m	Y
V	Bentinck Road.	R	X455808	Y340799	NO_2	N	Y (0m)	6m	Y
A	Ilkeston Road	R	X455653	Y340126	NO_2	N	Y (0m)	6m	Y

Site Name		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?
Diffusion Tubes									
W	Ransom Drive	UB	X458287	Y342399	NO_2	N	Y (5m)	3m	-
B	Noel St. Baths	UB	X455795	Y341911	NO_2	N	Y (22m)	2m	-
Other Non-automatic Monitoring									
AURN Clinton St East		UC	X457437	Y340049	Benzene Dark Smoke	N	Y (0m)	35m	N
Site Types: R = roadside UB= urban background UC = urban centre									

2.2 Comparison of Monitoring Results with Air Quality Objectives

Nottingham City Council's 2009 automatic and non-automatic monitoring data are shown in Tables 2.3a page 24 and 2.3b page 26. Comparison with the Air Quality Objectives (AQO) has been made and where the relevant AQO has been exceeded the figure is highlighted in bold type.

The results show that for the pollutants measured there are no exceedences of Air Quality Objectives(AQOs) outside the 2010 Air Quality Management Areas (AQMAs).

Exceedences of the nitrogen dioxide annual mean AQO were measured at two of the four automatic monitoring sites and at fourteen diffusion tube locations. All of these are where there is relevant public exposure, they are mainly residential properties and all are within the existing AQMAs.

The trend information shows that the nitrogen dioxide annual mean AQO has been exceeded at the CG NOx roadside site (within No.2 AQMA) since its start up in 2005 and that there was a gradual increase in levels for the first 4 years.

In contrast the trend at the 2 non-roadside sites (AURN and AQMS) has been for decreasing concentrations that have levelled out for the last few years with no exceedences of the nitrogen dioxide annual mean AQO measured since 2004.

At both of the continuous monitoring sites i.e. AURN and AQMS, the 2009 annual mean PM_{10} levels were considerably below the annual mean AQO value and the 24-hour AQO was not exceeded at either site. The trend data at these sites show that the annual mean AQO has not been exceeded since monitoring started in 1996 (AURN) and that PM_{10} levels decreased initially and generally have levelled out since 2002.

There were no exceedences of the sulphur dioxide, carbon monoxide and benzene AQOs. The trend information for sulphur dioxide and benzene pollutants shows that concentrations have been reducing with a significant decrease in measured levels at the AURN since 2006. This coincides with the completion of the Turning Point North traffic scheme that significantly reduced the levels of traffic on the formerly major through traffic route near to the monitoring station. Carbon monoxide levels have also been low and have been decreasing.

2.2.1 Nitrogen Dioxide

Information is given for both continuous and diffusion tube nitrogen dioxide 2009 monitoring results. The data show that measured annual mean NO_2 concentrations were greater than 40µg/m^3 at two automatic and a number of diffusion tube sites and therefore the annual mean AQO was exceeded. All of these sites are within the AQMAs.

The results also show that no1-hour means above 200µg/m^3 were recorded and there were no diffusion tube concentrations greater than 60µg/m^3 therefore the 1-hour AQO was not exceeded.

Automatic Monitoring Data

The nitrogen dioxide annual mean AQO concentration of 40µg/m^3 was exceeded at the CG NOx and LS NOx roadside sites -Table 2.3a. Both stations are close to residential properties and were initiated as a result of previous rounds of Review & Assessment.

CG NOx is located in the Nottingham No.2 AQMA 2010 whilst LS NOx is now within the amended AQMA i.e. Nottingham No.3 AQMA 2010. Figure 2.1 is a map showing the locations of the automatic monitoring sites.

No exceedences of the 1-hour AQO were recorded in 2009 at any of the sites – see Table 2.3b.

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA 2010?	Data Capture for full calendar year 2009 %	Annual mean concentrations (µg/m^3)		
				2007	2008	2009
AURN	Clinton Street East	N	92.7	33.3	33.0	34.5
CG NOx	Carter Gate	Y	97.1	**42.4**	**43.5**	**40.4**
AQMS	QMC Clifton Blvd	N	95.1	34.0	34.6	34.7
LS NOx	Lace Street	Y	98.7	-	**41.5**	**39.8**

January 2009 – December 2009 ratified data

The concentration is highlighted in bold type where the NO_2 annual mean AQO (40 µg/m^3) has been exceeded when figures are rounded to an integer.

The trends in annual mean nitrogen dioxide levels for those automatic sites with more than 5 years of data i.e. AURN, CG NOx and AQMS are shown in Figures 2.3 A – C next page. The trend lines shown on each graph were drawn using the Microsoft Excel spreadsheet package.

Figure 2.3 A - C Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites.

Figure 2.3 A

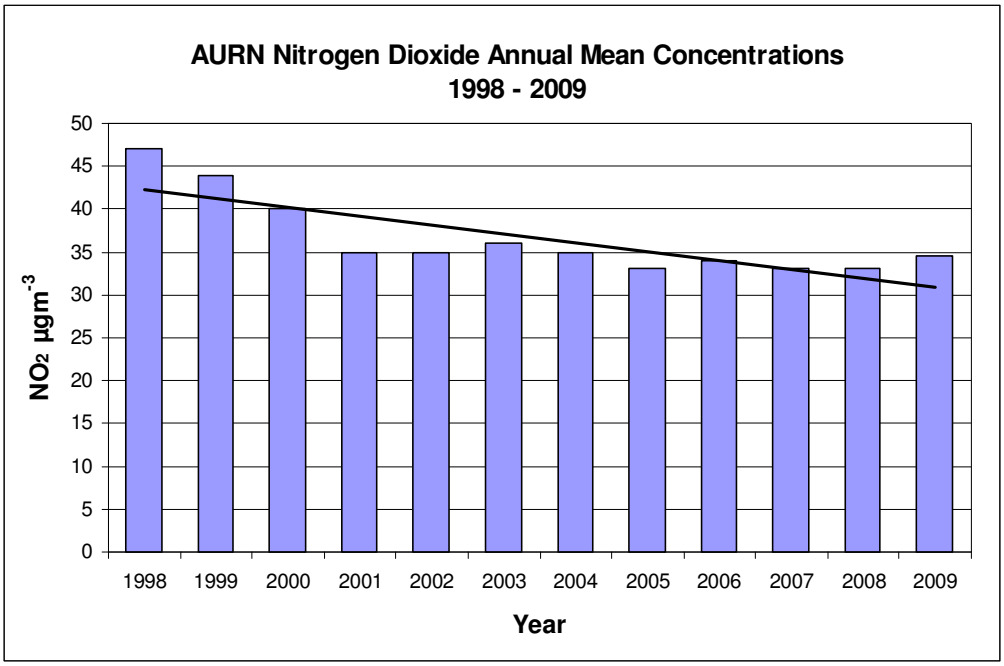


Figure 2.3 A - at the AURN the overall trend between1998 and 2009 shows decreasing annual mean nitrogen dioxide concentrations. However the figure also shows that levels decreased significantly between 1998 and 2001 and have been relatively steady with minor year-on-year variations since then.

Figure 2.3 B

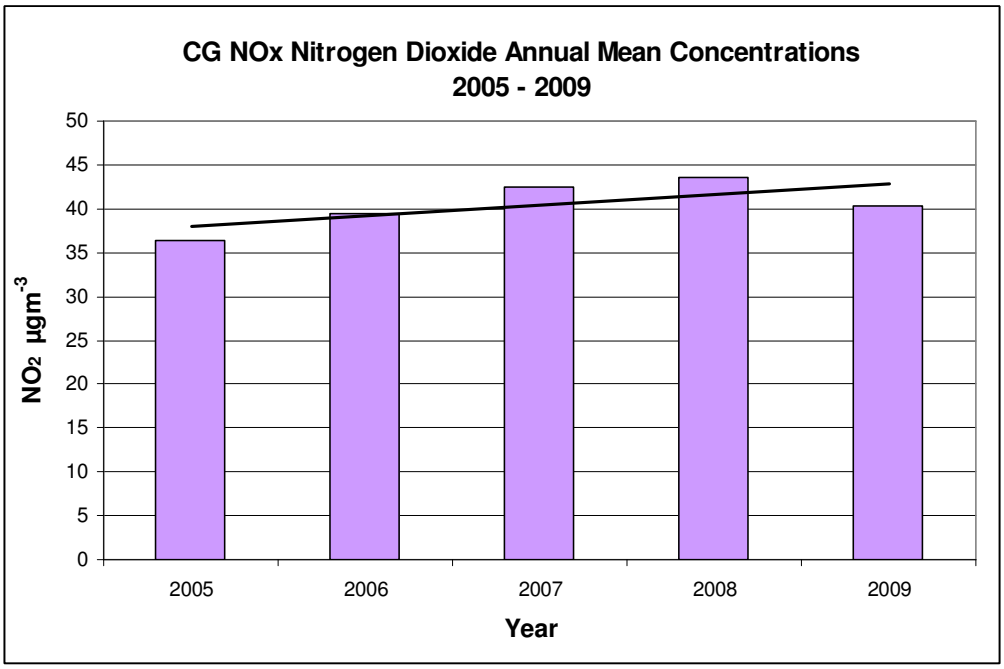


Figure 2.3 B - at the CG NOx roadside site the overall trend shows increasing annual mean nitrogen dioxide concentrations that slightly exceed the annual mean NO_2 AQO.

This is probably indicative of increasing road traffic levels and contrasts with the trend at the AURN which is an urban centre site.

Figure 2.3 C

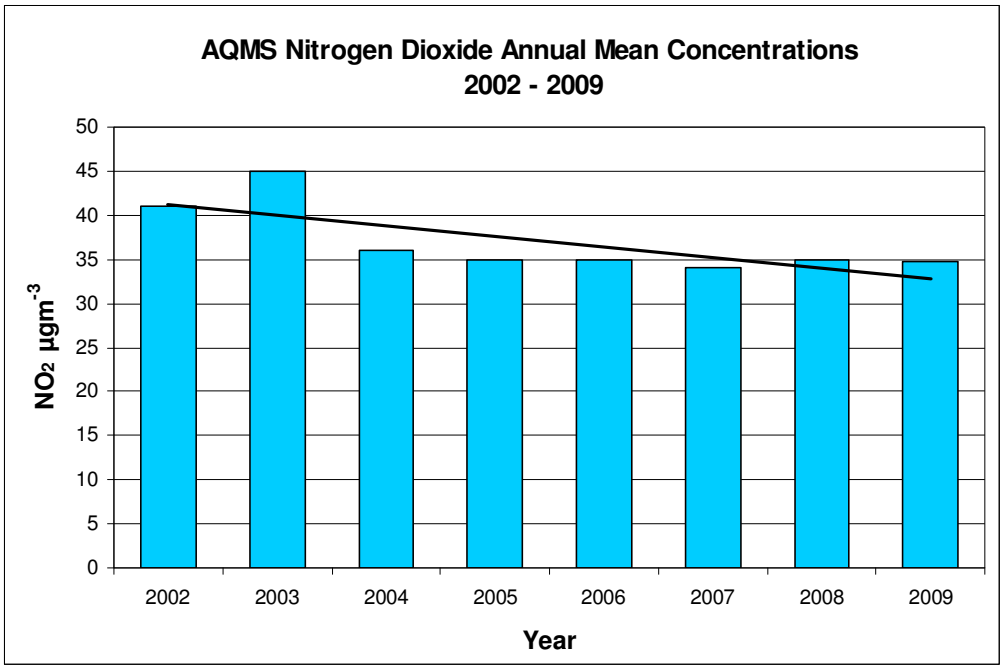


Figure 2.3 C - at the AQMS the overall trend between 2002 and 2009 shows decreasing concentrations but as shown in the figure there has been very little change in annual mean nitrogen dioxide levels measured at this site between 2004 and 2009.

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site Id	Location	Within AQMA 2010?	Data Capture for full calendar year 2009 %	Number of Exceedences of hourly mean (200 µg/m^3)		
				2007	2008	2009
AURN	Clinton Street East	N	92.7	0	6	0
CG NOx	Carter Gate	Y	97.1	3	0	0
AQMS	QMC, Clifton Blvd.	N	95.1	0	0	0
LS NOx	Lace Street	Y	98.7	-	4	0

Diffusion Tube Monitoring Data

The annual mean NO_2 AQO was exceeded at 14 diffusion tube sites. The data is shown in Table 2.4 and exceedences of the AQO (40 µg/m^3) are highlighted in bold type.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA 2010?	Data Capture 2009 %	2009 Annual mean concentrations NO_2 (µg/m^3) Bias Adjusted
C	Clifton Boulevard	N	100	31
D	Beeston Road (1)	Y	100	**46**
F	Beeston Road (2)	Y	100	**48**
G	Beeston Road (4)	Y	100	39
I	Derby Road (1)	N	100	32
X	Western Boulevard	N	100	33
K	Castle Boulevard	Y	92	**42**
K2	Castle Boulevard (2)	Y	100	37
M	Canning Terrace	Y	100	**47**
N	Upper Parliament St.	Y	100	**48**
O	Shakespeare St.	Y	100	**46**
O2	Shakespeare St.(2)	Y	92	**52**
P	Mansfield Road	Y	100	**45**
P2	Mansfield Road (2)	Y	92	**43**
Q	Woodborough Road	Y	100	**49**
Y	Beck Street	Y	100	**47**
S	Carter Gate	Y	100	**42**
T	Queen's Road	Y	100	**52**
T2	Queen's Road (2)	Y	100	**52**
Z	Kinglake Place	N	100	31
U	Trent Bridge	Y	100	35
V	Bentinck Rd	N	100	35
A	Ilkeston Road	N	100	27
W	Ransom Drive	N	100	6
B	Noel Street Baths	N	100	23

January 2009 – December 2009

Single tubes were located at the above sites.

The bias adjustment factor applied = 0.913 and the raw data for the monthly values are shown in Appendix B Table B-1.

Maps showing the trends in diffusion tube annual mean nitrogen dioxide levels at a number of roadside sites with at least 5 years of data and the site locations with respect to the AQMAs are shown in Figures 2.4 A and B below.

The trend lines plotted on each of the graphs were drawn using the Microsoft Excel spreadsheet package.

Figure 2.4 A City Centre

Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations 1997 - 2009

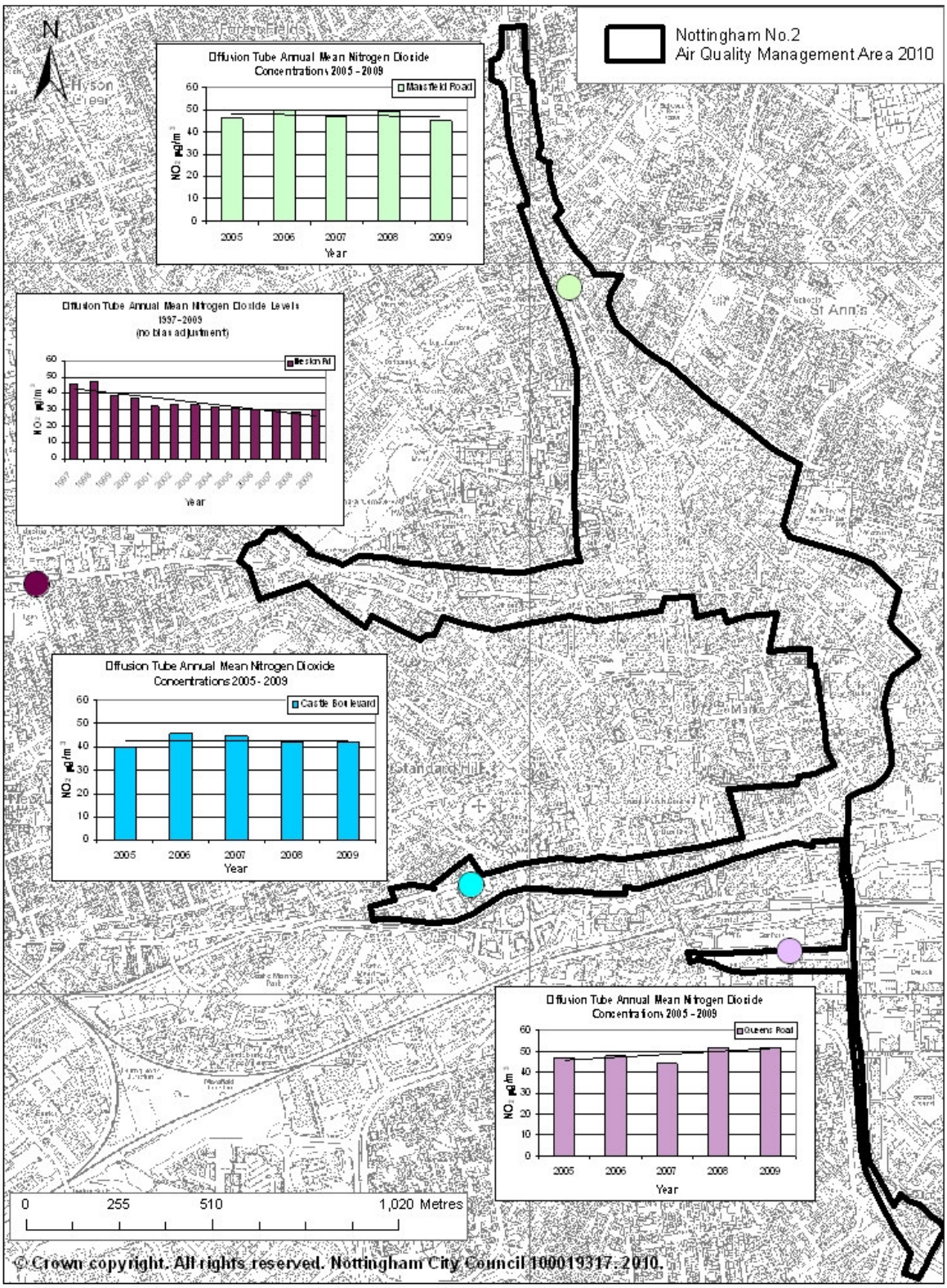


Figure 2.4 B Dunkirk Area

Diffusion Tube Annual Mean Nitrogen Dioxide Concentrations 2005 - 2009
Beeston Road

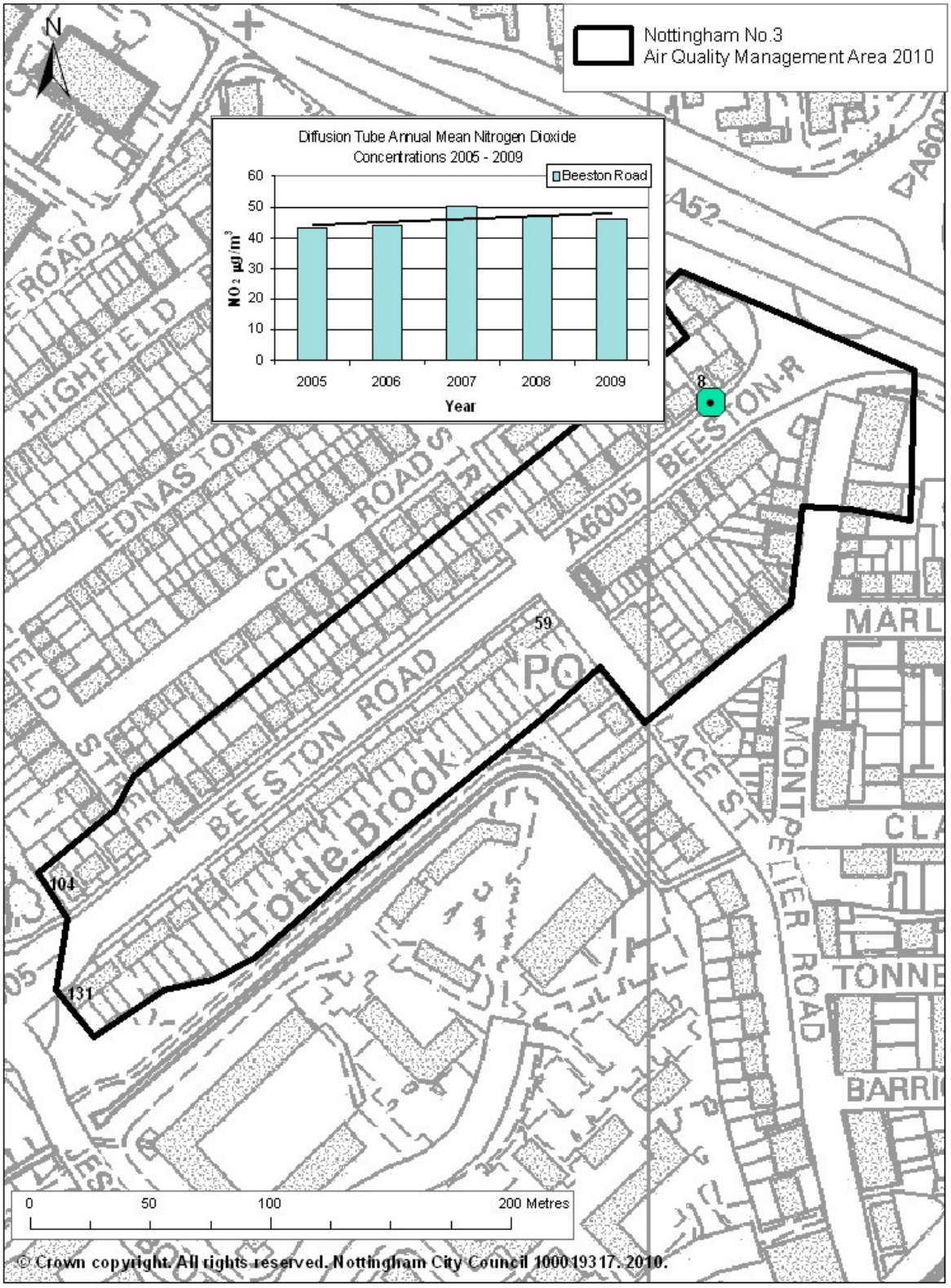


Figure 2.4 A - City Centre area shows:

- the Ilkeston Road roadside site (established as part of the national NO_2 survey) trend data indicates decreasing annual mean nitrogen dioxide averages from 1997 to 2009. However it is apparent that in more recent years 2004 to 2009 the relatively low NO_2 levels have been similar year on year with no exceedences of the annual mean AQO. Consequently this site is not within the No.2 AQMA.

- Within No2 AQMA the annual mean nitrogen dioxide trends at both the Castle Boulevard and Mansfield Road roadside sites show that the AQO has been exceeded each year between 2005 and 2009 - the levels being slightly higher at the latter site. The trends at both sites are similar to Ilkeston Road 2004 -2009 in that levels are similar each year.

- In contrast - at the Queens Road roadside site, which is also within No.2 AQMA, the trend shows increasing annual mean NO_2 concentrations with higher NO_2 averages than at any of the above mentioned sites.

Figure 2.4 B - Dunkirk Area shows:

- The trend at the Beeston Road roadside site also indicates increasing NO_2 levels that exceed the annual mean AQO although concentrations are lower than those at Queen's Road. The site is within the current No.3 AQMA and was also in the original AQMA declared in 2002. The 2005 to 2009 data is given to allow direct comparison with the sites within No.2 AQMA shown in Figure 2.4 A.

2.2.2 PM_{10}

There is relevant public exposure at the AQMS site where PM_{10} was measured during 2009.

The annual mean and 24-hour mean PM_{10} gravimetric equivalent concentrations for the site are given in Tables 2.5a & b below and show that the annual mean and 24 hour mean PM_{10} AQOs were not exceeded.

The AQMS figures have been corrected to TEOM FDMS using the Volatile Correction Model (VCM) - see Appendix A.

Prior to 2009, PM_{10} was measured at the AURN site and it recommenced in 2010 consequently there is no data available for last year. However $PM_{2.5}$ monitoring at AURN was initiated in 2009 and the results are given in Table 2.5c - currently there are no LAQM AQOs for this pollutant.

Table 2.5a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA 2010?	Data Capture for full calendar year 2009 %	Annual mean concentrations (µg/m^3) PM_{10} TEOM FDMS 2009
AQMS	QMC Clifton Blvd	Y	95.4	21

12 months ratified data 1 January 2009 – 31 December 2009

Table 2.5b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA 2010?	Data Capture 2009 %	Number of exceedences of daily mean objective (50 µg/m^3) 2009
AQMS	QMC Clifton Blvd	Y	95.4	5

12 months ratified data 1 January 2009 – 31 December 2009

Table 2.5c Results of $PM_{2.5}$ Automatic Monitoring

Site ID	Location	Within AQMA?	Data Capture for full calendar year 2009 %	Annual mean concentrations (µg/m^3) $PM_{2.5}$ TEOM FDMS 2009	Number of times the daily mean >= 50 µg/m^3 2009
AURN	Clinton St East	N	91	14	3

12 months ratified data 1 January 2009 – 31 December 2009

PM_{10} Trend Data

Figures 2.5 A and 2.5 B present the PM_{10} trend data for the AURN and AQMS respectively. The values show gravimetric equivalent PM_{10} annual mean concentrations with a distinction between the gravimetric adjustment used prior to 2005 and TEOM FDMS correction used since then.

At both sites there has been a downward trend with slightly higher levels at the AQMS site. At AURN since 2005 the trend is slightly upwards in contrast to AQMS where it is approximately level.

Figure 2.5 A

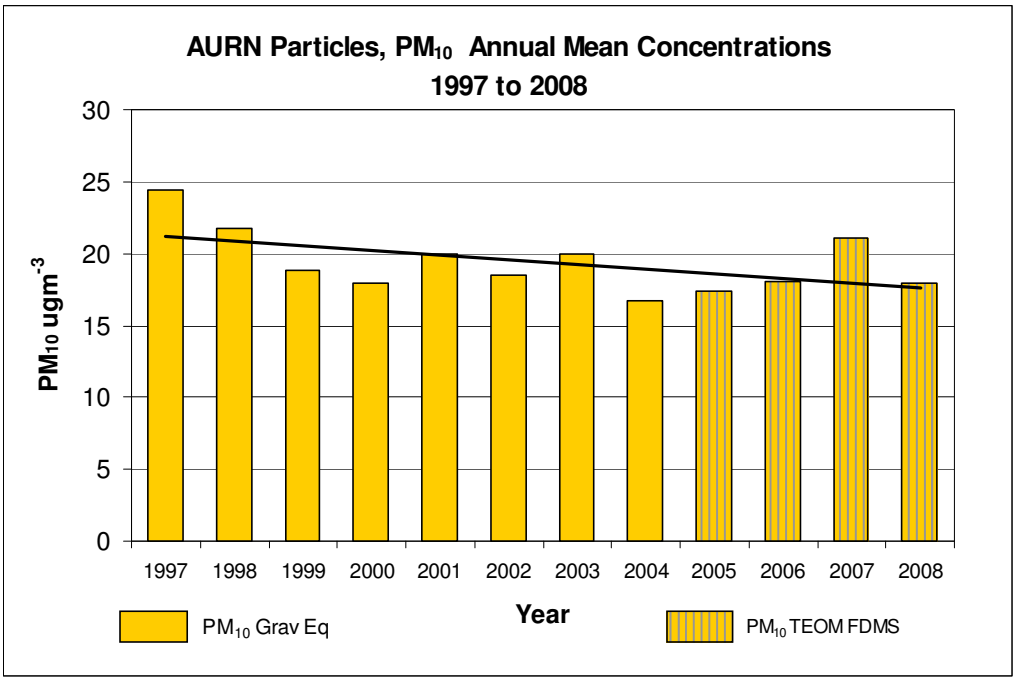
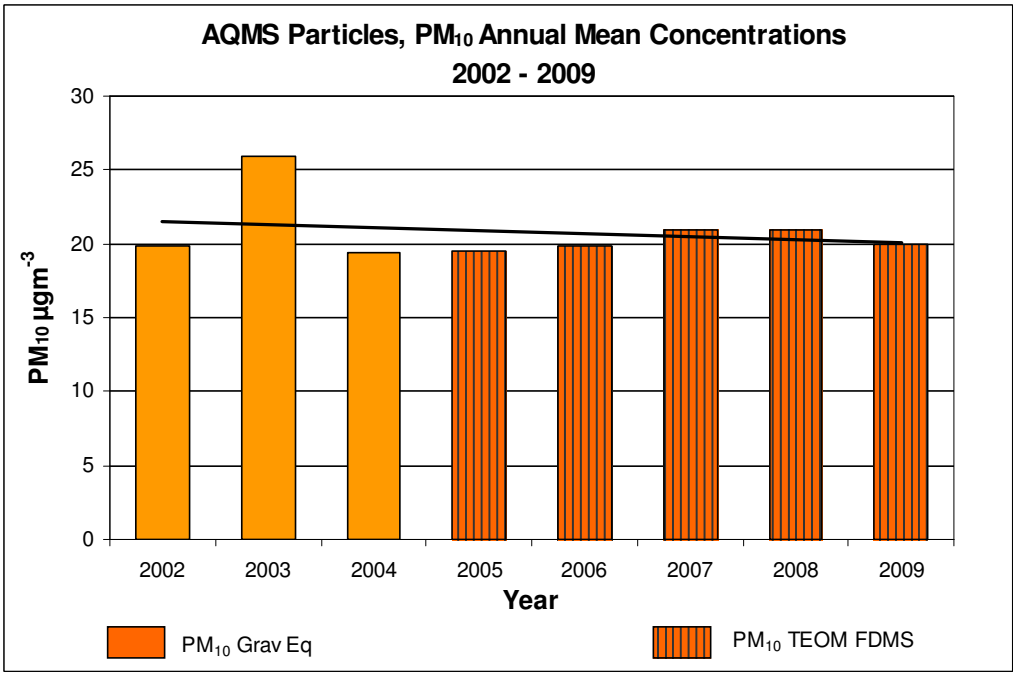


Figure 2.5 B



2.2.3 Sulphur Dioxide

Sulphur dioxide was monitored at the AURN, CG NOx and AQMS sites during 2009. No exceedences of any of the objectives were recorded and levels were low.

Graphs 2.6a and 2.6b show that the trend has been for decreasing annual mean sulphur dioxide concentrations at the AURN and AQMS sites with levels being relatively higher at the AURN than at AQMS probably due to the proximity of traffic to the sites or possibly industrial sources.

There are significant reduction in levels at the AURN from 2006 onwards. As referred to earlier in this section this decrease is likely to be due to the introduction of a major traffic scheme.

Table 2.6 Results of SO_2 Automatic Monitoring: Comparison with Objectives

Site ID	Location	Within AQMA?	Data Capture 2009 %	Number of Exceedences of:		
				15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
AURN	Clinton Street East	N	97.2	0	0	0
CG NOx	Carter Gate	Y	98.2	0	0	0
AQMS	QMC, Clifton Blvd.	Y	98.5	0	0	0

12 months ratified data 1 January 2009 – 31 December 2009

Sulphur Dioxide Trend Data

Figure 2.6A

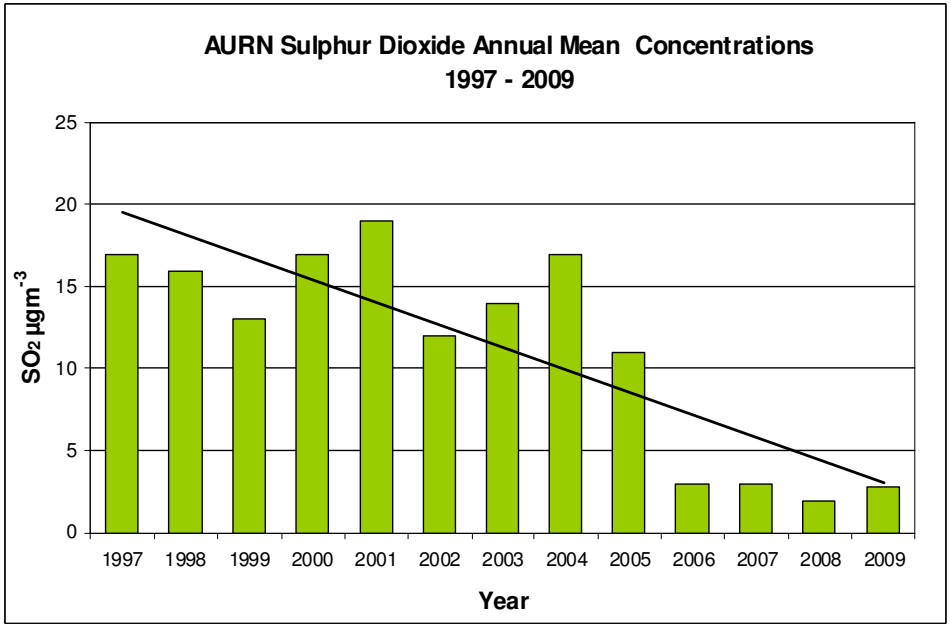
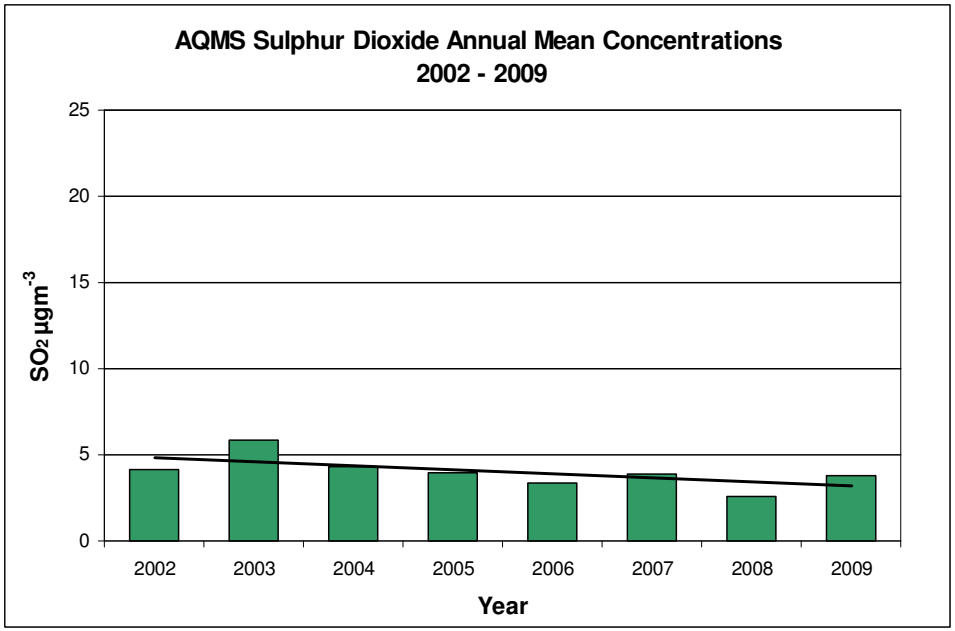


Figure 2.6B



2.2.4 Benzene

2009 benzene levels at the AURN were low. Whilst running means cannot be measured using the pumped diffusion tube methodology the results show that it is highly unlikely that the benzene AQ objectives were exceeded.

Table 2.7 Results of Benzene Pumped Tube Monitoring: Annual Mean

Site ID	Location	Within AQMA?	Data Capture 2008 %	2009 Annual mean concentration Benzene ($\mu g/m^3$)
AURN	Clinton Street East	N	100	0.76

12 months ratified data – 01/01/2008 to 31/12/2009

Benzene Trend Data

Figure 2.7

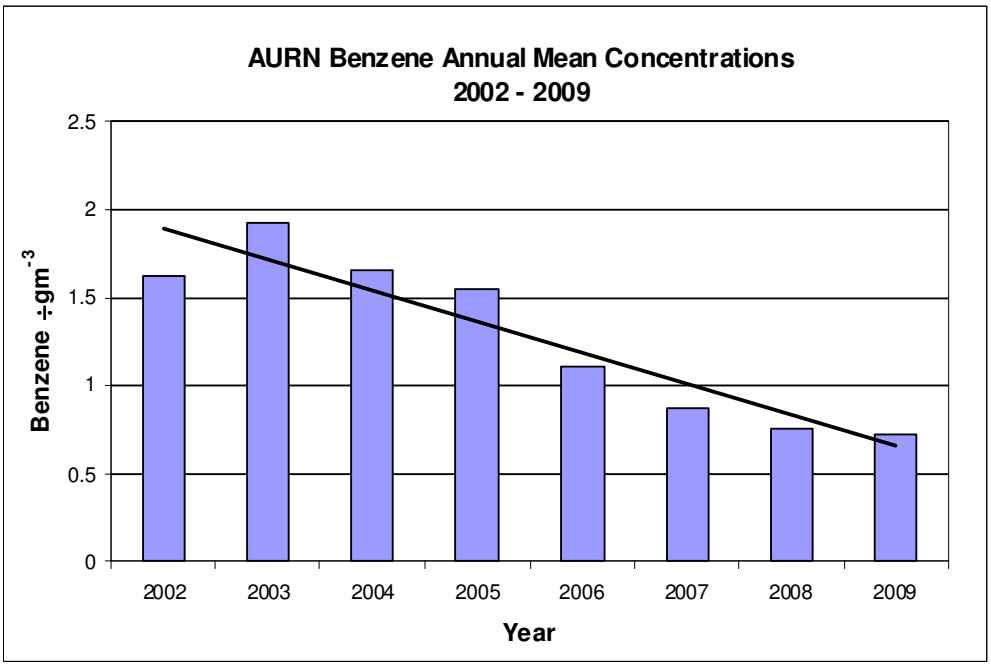


Figure 2.7 above shows that there is a general downward trend in measured levels of benzene at this site. Whilst concentrations have been low throughout there is a noticeable reduction that is evident from 2006 onwards. This coincides with the implementation of the Turning Point North traffic management scheme.

Further information about this scheme can be found on Nottingham City Council's website at http://www.nottinghamcity.gov.uk/index.aspx?articleid=1660.

2.2.5 Carbon Monoxide

Carbon monoxide levels at the AQMS were again low and there was no exceedence of the carbon monoxide running 8-hour mean AQ objective.

Table 2.8 Results of CO Automatic Monitoring: Comparison with Running 8-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2009 %	2009 Maximum daily running 8 hour mean CO (mg/m^3)
AQMS	QMC, Clifton Blvd.	Y	98.7	1.6

12 months ratified data – 01/01/2009 to 31/12/2009

The trend graphs below show that, for both the AURN (Figure 2.8 A) and AQMS Figure 2.8 B), monitored levels of CO been low and have decreased over a number of years. The higher levels at the AURN urban background site reflect the closeness of site to the road. CO is rapidly oxidised in the atmosphere and measured levels are affected by the proximity of the monitoring site to the traffic.

Figure 2.8 A

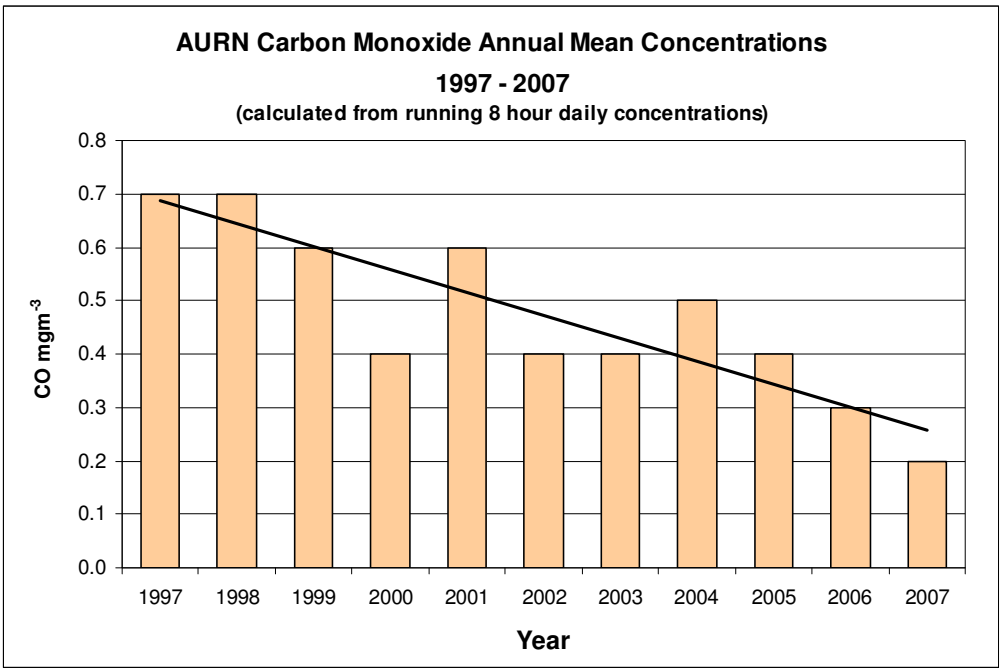
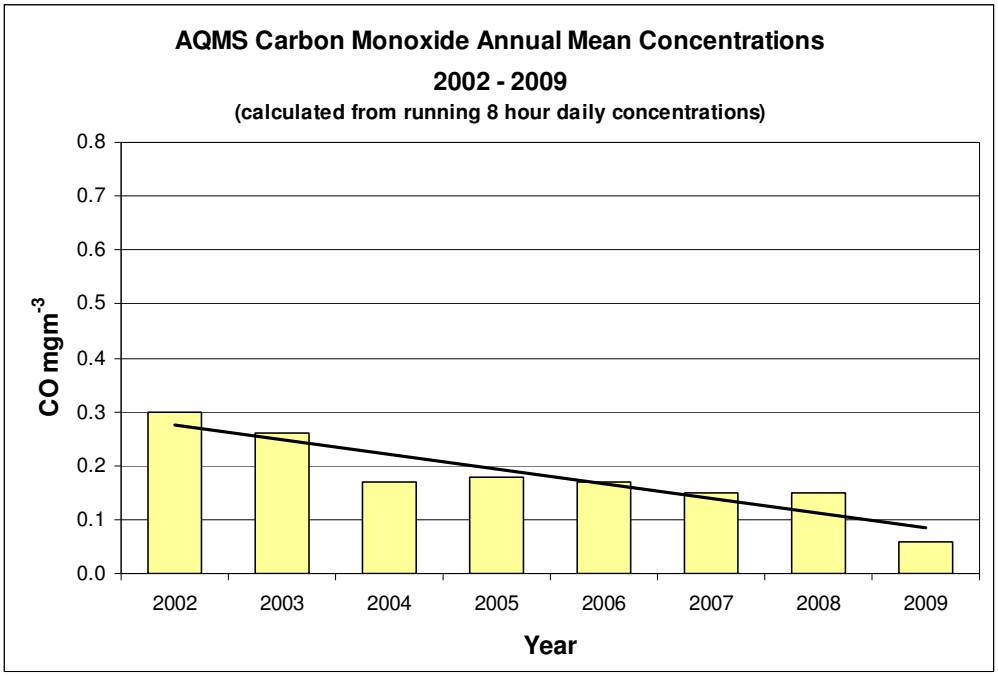


Figure 2.8 B



2.2.6 Ozone

Ozone has been monitored at the AURN and AQMS since 1997 and 2002 respectively. The trends for the daily maximum 8 hour yearly data at these sites are shown in Graphs 2.9 A and 2.9 B next page. It can be seen that the highest value of 54 µg/m^3 was measured at the AURN in 2006 and 2008.

At the AURN ozone levels have been increasing with the 2009 value being approximately 4 µg m^{-3} lower than in 2008 - this is consistent with national data for urban background sites.

"Urban background ozone levels averaged 55 µg m^{-3} in 2009 compared to 59 µg m^{-3} in 2008 and 44 µg m^{-3} in 1992, the first available data. These levels had shown an overall increasing trend since 1992, but this has shown signs of levelling out in recent years.*

** Measured as the daily maximum 8-hour running mean"*

(Ref http://www.airquality.co.uk/news.php?news_id=133 , 06/05/2010).

In contrast the AQMS ozone concentrations are significantly lower and with the exceptions of 2003 and 2007 have been similar year on year – Figure 2.9 B.

Figure 2.9 A

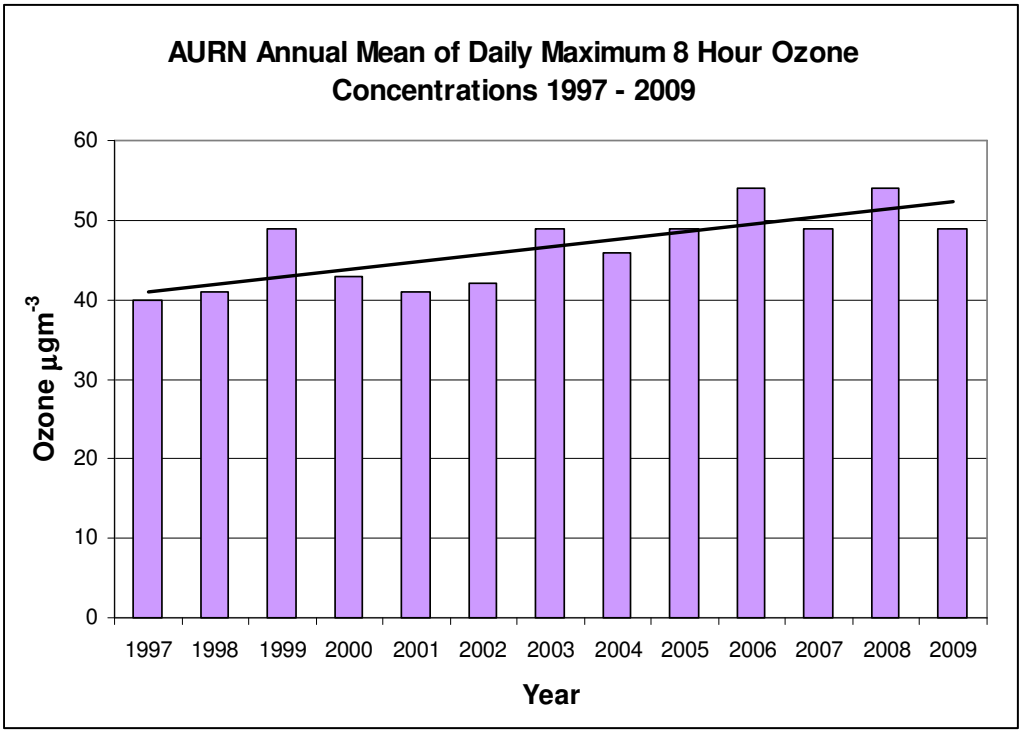
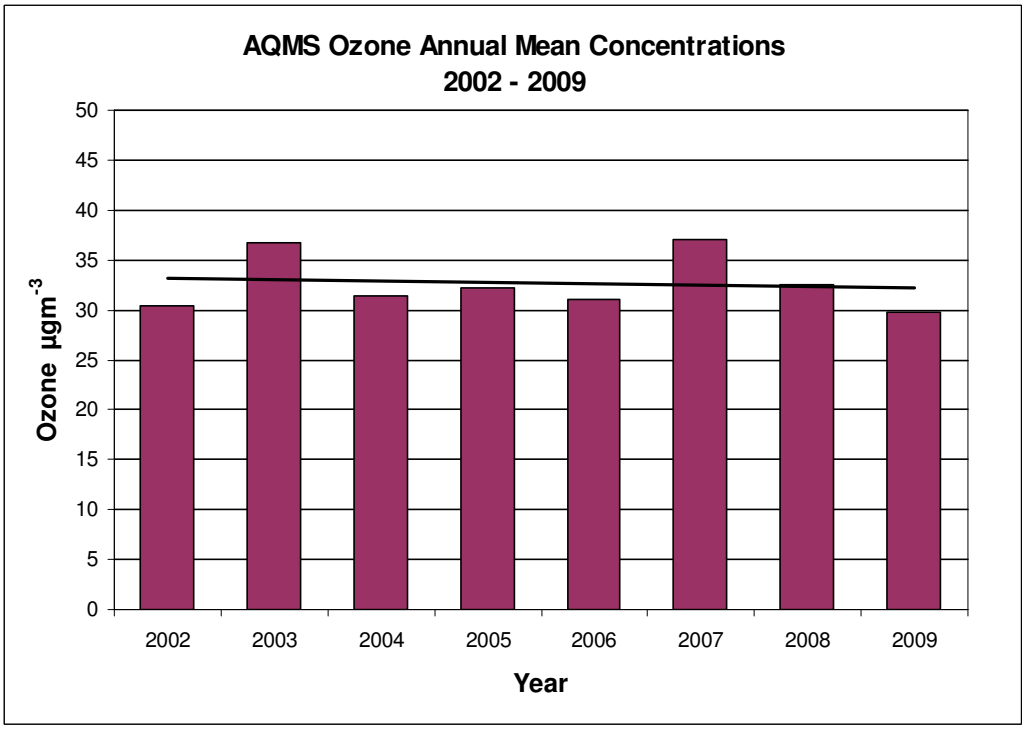


Figure 2.9 B



2.2.7 Summary of Compliance with AQS Objectives

Nottingham City Council has examined the results from monitoring in the Nottingham City area. Whilst there are both continuous and diffusion tube monitoring sites where the annual mean nitrogen dioxide Air Quality Objective is exceeded - these are within existing Air Quality Management Areas.

Concentrations outside of the AQMAs are all below the Air Quality Objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

The Nottingham Local Plan (adopted November 2005) is the current Statutory Local Plan for the City of Nottingham and provides the basis for decisions related to land use planning. The Plan is in use until it is replaced by the emerging Local Development Framework (LDF).

The Local Development Framework sets out the long-term spatial vision for the whole of the Nottingham City Council area. It includes policies for delivering the strategy; as well as general criteria-based policies for assessing all planning applications. Further information with regard to the Nottingham Local Plan and the LDF is given below in Section 6 – Air Quality Planning Policies.

The following areas for possible new local developments have been considered:

- Road Traffic Sources
- Other Transport Sources
- Industrial Sources
- Commercial and Domestic Sources - since the USA 2009 fourteen proposed new wood burning biomass boiler installations have been identified - none need to be regulated under the Pollution Prevention and Control Act 1999. The burners are mainly for new school buildings or associated with new commercial premises and consequently air quality assessments have been or will be undertaken as part of the planning consultation process.

  From the reports submitted none of the installations is likely to have an significant adverse impact on air quality either singly or in combination since they are spatially separated.

  Limited information is available about the use of biomass burners in domestic premises but in the Nottingham City area it appears to be low - three have come to Environmental Health's attention during the last 3 years.

  Nottingham City Council is of the opinion that the current level of domestic biomass combustion is so low that it can be considered that there is no significant impact on air quality. This conclusion will be kept under review.
- New Developments with Fugitive or Uncontrolled Sources.

Nottingham City Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

4 Local / Regional Air Quality Strategy

Nottingham City Council is a member and currently chair of the Nottinghamshire Environmental Protection Working Group and a signatory to the Nottinghamshire Air Quality Strategy revised 2008 (the Strategy) entitled 'A Breath Of Fresh Air for Nottinghamshire - An Air Quality Improvement Strategy for the Next Decade'.

The Strategy was prepared by a partnership of Nottinghamshire Local Authorities, the Environment Agency, the Health Protection Agency and the Highways Agency It is designed to help local authorities and partner organisations manage and improve ambient air quality and to protect the health and wellbeing of the public in a co-ordinated and integrated manner. It considers actions that will be taken and should be supported in a number of sectors:-

- Public sector e.g. facilitate meetings of Nottinghamshire AQ Steering Group, review on a local basis and when practical reduce emissions to air from their own activities

- Transport e.g. use air quality targets in Local Transport Plans, restricted vehicular access where appropriate

- Planning and land use e.g. ensure AQ is a material consideration when assessing planning applications, develop and implement procedures for consultation with neighbouring Councils where deterioration in AQ is predicted

- Health and education e.g. work with Primary Care Trusts, HPA and others to raise awareness about poor air quality, the health effects etc.

- Energy efficiency e.g. review energy usage and put in place initiatives to improve energy efficiency where appropriate

- Industrial and commercial e.g. rigorously enforce legislation to control emissions of air pollutants, assist and advise businesses in complying with relevant legislation

- Climate change and global warming e.g. reduce CO_2 emissions caused by energy use in Council buildings, purchase low carbon green electricity

- Domestic sector e.g. encourage reduction and recycling of household waste, encourage domestic households to remove polluting appliances

Nottingham City Council has implemented and continues to implement a significant proportion of the actions recommended within the Strategy.

The Strategy may be viewed at:

http://www.nottinghamcity.gov.uk/CHttpHandler.ashx?id=2382&p=0

It is proposed to review the Strategy in 2015.

5 Planning Applications

All planning applications are considered for their potential adverse impact on air quality.

It has been determined that there are no applications outside the two Air Quality Management Areas are likely to have an adverse impact on air quality.

Developments within AQMAs

AQMA No:2 Nitrogen Dioxide

Burton Street
No developments considered to have a 'significant impact on air quality'.

Canal Street
No developments considered to have a 'significant impact on air quality'.

Carrington Street
No developments considered to have a 'significant impact on air quality'.

Derby Road

Application No:	10/00927/NDS4	Registration Date:	30/Mar/2010
Application Type:	PLANNING	Decision Date:	
Decision Type:			
Ward:	Dunkirk And Lenton		
Location:	NET Line Two Area B7 (QMC Area) Nottingham		
Development:	Discharge of conditions 2, 3a, 3b, 3c, 3d, 3e, part 3g, 3h, part 3j, 3k, 3l, 4, part 5a, part 5b, 7a, part 7b, part 7c, part 10d, 10e, 11, 14 and 16 of planning permission granted 30th March 2009 in respect of the Nottingham Express Transit Order for Area		

http://plan4.nottinghamcity.gov.uk/WAM/pas/showCaseFile.do?councilName=Nottingham+City+Council&appNumber=10%2F00927%2FNDS4

No other developments considered to have a 'significant impact on air quality'.

Huntingdon Street
No developments considered to have a 'significant impact on air quality'.

London Road

Application No:	09/03501/POUT	Registration Date:	07/Dec/2009
Application Type:	PLANNING	Decision Date:	
Decision Type:			
Ward:	Bridge		
Location:	Former Hartwell Ford Site London Road Nottingham NG2 3AG		
Development:	Mixed use development comprising up to 18,775m2 of office floor space (Class B1), 1,928m2 of commercial floor space (Classes A1, A2, A3, A4 and D1) car parking, and pedestrian footbridge.		

http://plan4.nottinghamcity.gov.uk/WAM/doc/Application%20Form-781934.pdf?extension=.pdf&wmTransparency=0&id=781934&wmLocation=0&location=VOLUME6&contentType=application%2Foctet-stream&wmName=&pageCount=1

Air quality impact assessment undertaken but concluded development would not have significant impact.

No other developments considered to have a 'significant impact on air quality'.

North Sherwood Street
No developments considered to have a 'significant impact on air quality'.

Queens Road
No developments considered to have a 'significant impact on air quality'.

Station Street
No developments considered to have a 'significant impact on air quality'.

Wollaton Street
No developments considered to have a 'significant impact on air quality.

Developments in AQMA No:3 Nitrogen Dioxide

Abbey Street
No developments considered to have a 'significant impact on air quality'.

Beeston Road
No developments considered to have a 'significant impact on air quality'.

Derby Road (and NHS University Hospital Campus, Derby Road)
See AQMA No.2 Derby Road - NET line 2 above.

Leen Gate

Application No:	09/01414/POUT	Registration Date:	23/Jun/2009
Application Type:	PLANNING	Decision Date:	18/Sep/2009
Decision Type:	Grant conditional permission		
Ward:	Dunkirk And Lenton		
Location:	Land South Of Leen Gate And Car Park To North Of Leen Gate Nottingham NG7 2LX		
Development:	Outline application for MediPark (3.7Ha) comprising office (B1a), research and development (B1b) and education (D1) uses, ancillary facilities and associated parking and landscaping.		

http://plan4.nottinghamcity.gov.uk/WAM/doc/Application%20Form-765091.pdf?extension=.pdf&wmTransparency=0&id=765091&wmLocation=0&location=VOLUME6&contentType=application%2Foctet-stream&wmName=&pageCount=1

and

http://plan4.nottinghamcity.gov.uk/WAM/doc/Application%20Form-765095.pdf?extension=.pdf&wmTransparency=0&id=765095&wmLocation=0&location=VOLUME6&contentType=application%2Foctet-stream&wmName=&pageCount=1

Outline Travel Plan and Transport Assessments. However the development is not considered to have a 'significant impact on air quality'.

University Boulevard (and University of Nottingham)
No developments considered to have a 'significant adverse impact on air quality'.

6 Air Quality Planning Policies

6.1. Nottingham Local Plan 2005

The Nottingham Local Plan (adopted November 2005) is the current Statutory Local Plan for the City of Nottingham and provides the basis for decisions related to land use planning.

The Nottingham Local Plan was produced as part of the old planning system and will be 'saved' until it is replaced by the emerging Local Development Framework – further information given below.

Specific policies in the Local Plan that reference air quality can be found in Section 9 – Natural Environment:

Trees Protected by Tree Preservation Orders

NE6: Planning permission for development involving the cutting down, topping, lopping or uprooting of any tree protected by a Tree Preservation Order will not be granted unless, in the opinion of the City Council, it is necessary for valid arboricultural reasons, or for the satisfactory development of the site. Where such consent is granted, replacement planting will be required to offset loss of visual and natural amenity.

9.18 The City Council recognises the importance of trees in the City not only for the contribution they make to improving air quality, by acting as filters to pollution, but also their contribution to nature conservation, amenity and townscape.

Pollution

NE9: Planning permission will not be granted for development which would generate pollutants that would cause significant detriment to the users of the development, users of the adjoining land, or the environment; or where the level of existing pollutants would be a danger to users of the proposed development.

9.25 Planning Policy Statement 23 Planning and Pollution Control, stresses the importance of focussing on any potential for pollution which may affect the current and future uses of land. It includes details of the legislative controls outside the planning system which apply to air and water quality. Policy NE9 is in general conformity with PPS23.

9.26 Pollution in the form of air pollutants, noise or light can be prejudicial to human health and to the natural environment or can cause nuisance. It is therefore important to consider the risks and reduce unnecessary dangers arising from increased exposure to pollution.

9.27 Careful design, siting and landscaping can help to reduce the impact of pollution. Planning permission may be granted, where appropriate, subject to

conditions to ensure the effects of pollution are minimised to an acceptable level or as regulated by legislation.

Role of the Local Plan

10.4 The Local Plan will ensure that the LTP policies and programmes are carried through in terms of spatial, land use and development matters. It will provide the integration between land use planning and planning for transport.

10.5 It provides a policy framework for implementing the key strategies of the LTP, to safeguard land where appropriate to achieve detailed proposals in those documents. The application of planning policy will be a key mechanism in delivering long-term travel demand management and in ensuring progress towards the LTP targets and objectives.

10.6 Strategic policy ST4 emphasises the importance of the Local Plan in supporting and implementing the policies of the LTP.

10.7 The objectives of the LTP which the Local Plan will support include:

h) To relieve communities from the adverse effects of through traffic, particularly heavy goods vehicles.

j) To improve air quality within the Plan area and to alleviate other transport impacts upon health.

The Nottingham Local Plan 2005 can be viewed at

http://www.nottinghamcity.gov.uk/CHttpHandler.ashx?id=536&p=0

6.2 Supplementary Planning Guidance (SPG)

SPGs were produced under the old Local Plan system to expand on the policies in the Local Plan. These SPGs could be considered as a 'material' consideration in determining planning applications.

The following SPGs have specific reference to air quality:

- Design Guide for Industrial, Commercial and Retail Development - this advises that the location of air pollution sources next to public open spaces should be avoided.

- Nottingham City Centre Pavement Cafes – this identifies that in certain parts of the city centre the quality of air from traffic fumes makes it inappropriate to site pavement cafés and the city council will not issue a license under such conditions. In other areas, consideration does need to be given to the proximity of bus stops and taxi ranks, not only from the aspect of air quality but also taking into account movement clusters of vehicles and people.

The SPG documents can be viewed at:

http://www.nottinghamcity.gov.uk/index.aspx?articleid=717

6.3 Local Development Framework (LDF)

The LDF is made up of Local Development Documents which set out what will be built in Nottingham in the future.

Nottingham's Local Development Framework (LDF) will be comprised of:

- Local Development Documents (LDDs) which include:

  - Development Plan Documents (DPDs) which, together with the Regional Spatial Strategy (RSS), are part of the statutory development plan, and

  - Supplementary Planning Documents (SPDs) which expand policies set out in DDS or provide additional detail

- Statement of Community Involvement (SCI)
- Local Development Scheme (LDS)
- Annual Monitoring Report (AMR).

The Local Development Scheme (LDS) is the project plan for the Local Development Framework (LDF). It sets out the timetable of when Local Development Documents will be prepared. The City Council keep the programme set out in the LDS under review and reports progress in the Annual Monitoring Report.

Latest News - June 2010

- The 'Site Specific Land Allocations and Policies Development Plan Document (DPD)' and 'Generic Development Control Policies DPD' have been combined into the Land and Planning Policy (LAPP) DPD and will operate to the established timetables.

Historic

- Following the publication of proposed changes to the East Midlands Regional Plan, the authorities within the Greater Nottingham area agreed to produce an 'aligned' Core Strategy. Consequently, it was necessary for the LDS to be revised to reflect this.
- New Local Development Schemes have been produced by all authorities within the Greater Nottingham area. The interim version approved by the City Council can be downloaded at the link shown below.
- The LDS has been submitted to the Government Office for the East Midlands (GOEM), and the City Council is currently in discussion with GOEM to gain final approval.
- The Core Strategy is a LDD and its timetable has subsequently been updated by the Joint Planning Advisory Board.

Information on the LDF and associated documents can be found at the following link:

http://www.nottinghamcity.gov.uk/index.aspx?articleid=740

7 Local Transport Plans and Strategies

Table 7.1 Local Transport Plan 2006/07-2010/11 - Local Indicators linked to Air Quality Action Plan Measures

Total local public transport patronage	Thousands of passenger journeys (i.e. boardings) per year in the authority								2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		Notes
		Financial	Thousand passenger journeys	Joint Plan Area	Base Data	2003/04	68,500	Actual Figures	**74,400**	**70,500**	**72,900**	**74,400**	**75,100**	**75,900**	**73,900**			Source: Operators returns The target equates to an 8% increase from the 2003/04 baseline (68,500). The figures from 2003/04 to 2006/07 have been revised from those previously reported. This is due to alterations in the monitoring of patronage with the introduction of smartcard technology that is now being apportioned between local authority areas on a more reliable basis to comply with DfT requirements. The figures since 2007/08 have been calculated using the new apprortioned results. This indicator is included as part of the National Indicators for Transport (NI 177).
					Target Data	2010/11	73,900	Trajectory	68,500	71,700	72,100	72,500	72,900	73,300	73,600	73,900		
of which number of bus passenger journeys - BVPI102									2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		Notes
		Financial	Thousand passenger journeys	Joint Plan Area	Base Data	2003/04	68,000	Actual Figures	**64,400**	**64,900**	**66,070**	**0**	**0**	**66,100**	**65,000**			Source: Operators returns The decline in bus patronage between 2003/04 and 2004/5 is a result of a planned transfer from bus to tram as a result of the implementation of the tram, which began operating in March 2004. The figures from 2003/04 to 2006/07 have been revised as above.
					Target Data	2010/11	63,700	Trajectory	63,300	63,400	63,500	63,600	63,700	0	0	0		
LTP2 - Change in area wide road traffic									2003	2004	2005	2006	2007	2008	2009	2010		Notes
		Calendar	Million Vehicle Kilometres per annum	Joint Plan Area	Base Data	2004	2,933	Actual Figures	2,929	2,933	**2,921**	**2,921**	**2,916**	**2,852**	**2,869**			Source: Council monitoring using DfT National Traffic Census and locally collected data. The target equates to a 6% increase in traffic from the baseline on the local authority managed road network.
					Target Data	2010	3,109	Trajectory	2,929	2,933	2,962	2,992	3,021	3,050	3,079	3,109		
LTP3 - Cycling trips (annualised index)									2003	2004	2005	2006	2007	2008	2009	2010		Notes
		Calendar	Index based on 2003 = 100	Joint Plan Area	Base Data	2003	100	Actual Figures	100	104.7	**105.3**	**103.8**	**94.8**	**99.1**	**98.4**			Source: Council monitoring Surveys are undertaken at 33 points on the Greater Nottingham cycle network, between April and September.. This methodology was established in 2005. The 2003 and 2004 figures are derived from 12 of these points. 2007 data affected by weather, particularly in June/July. Monitoring for the first half of 2008 is showing a return to previous cycling levels.
					Target Data	2010	107	Trajectory	100	101	102	103	104	105	106	107		
LTP5 - Bus punctuality indicator	% of buses starting route on time								2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		Notes
		Financial	Percentage	Joint Plan Area	Base Data	2005/06	92%	Actual Figures	N/A	N/A	**92%**	**93%**	**94%**	**95%**	**94%**			Source: Council monitoring / Operators' data, collected quarterly. The baseline was derived from data collected in the last two quarters of 2005/06 only. More detailed data became available through the Punctuality Improvement Plan (PIP), adopted in April 2006. The Traffic Commissioners minimum standards are for **95%** of services to be within 1 minute early or 5 minutes late of scheduled time. The DfT target is for 90% of services to be within this time frame by 2014. As a result of the autorities aiming to achieve this by the end of 2010/11, it is a **stretched target**. Indicator included as part of National Indicators for Transport (NI 178).
					Target Data	2010/11	95%	Trajectory	N/A	N/A	92%	92%	93%	93%	94%	95%		
	% of buses on time at intermediate timing points								2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		Notes
		Financial	Percentage	Joint Plan Area	Base Data	2005/06	77%	Actual Figures	N/A	N/A	**77%**	**83%**	**82%**	**84%**	**83.70%**			Source: Council monitoring / Operators' data, collected quarterly. The baseline was derived from data collected in the last two quarters of 2005/06 only. More detailed data became available through the Punctuality Improvement Plan (PIP), adopted in April 2006. The Traffic Commissioners minimum standards are for 70% of services to be within 1 minute early or 5 minutes late of scheduled time. The DfT target is for 90% of services to be within this time frame by 2014 and the authorities trajectory is based upon this target. Indicator included as part of National Indicators for Transport (NI 178).
					Target Data	2010/11	82%	Trajectory	N/A	N/A	77%	78%	79%	80%	81%	82%		
	Average excess waiting time on frequent service routes								2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		Notes
		Financial	Minutes	Joint Plan Area	Base Data	2005/06	0.71 mins	Actual Figures	N/A	N/A	**0.71 mins**	**0.57mins**	**0.63mins**	**0.60mins**	**0.63mins**			Source: Council monitoring/Operators' data, collected quarterly. The baseline was derived from data collected in the last two quarters of 2005/06 only. More detailed data became available through the Punctuality Improvement Plan (PIP), adopted in April 2006. The bus operators' current performance is well within the maximum excess waiting time of 1.25 minutes set by the Traffic Commissioners. As such a minimum target has been set for a year on year increase. Indicator included as part of National Indicators for Transport (NI 178).
					Target Data	2010/11	0.66 mins	Trajectory	N/A	N/A	0.71 mins	0.70 mins	0.69 mins	0.68 mins	0.67 mins	0.66 mins		

indicator on track progress uncertain

LTP7 - Congestion	Average journey time per person per mile, related to person throughput	Financial	Seconds	Joint Plan Area	Base Data	2005	228 sec	Actual Figures		2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		Notes
										N/A	N/A	**228 sec**	**231 sec**	**228 sec**	**226 sec**				Source: Council monitoring
					Target Data	2010	252 sec	Trajectory		N/A	N/A	228 sec	233 sec	238 sec	242 sec	247 sec	252 sec		The congestion target for Greater Nottingham is to achieve a no more than 10.5% increase in person journey time per mile in the context of a 4.2% increase in travel (person miles) on the overall key route network. Indicator included as part of National Indicators for Transport (NI 167) and Nottingham City and Nottinghamshire County Council LAAs.
L11: Accessible bus services	Number of fully accessible bus services	Financial	Number of services	Joint Plan Are	Base Data	2005/06	2	Actual Figures		2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		**Notes**
										N/A	N/A	2	**3**	**3**	**9**				Source: Council monitoring
					Target Data	2010/11	7	Trajectory		N/A	N/A	2	3	4	5	6	7		These are defined as services operated entirely by low-floor, easy access vehicles, where all bus stops have raised kerbs and where bus boarders are provided where parking is likely to inhibit use. 06/07 = 2 services: Citylink 1 and NCT service 11 completed along whole route. 07/08 = service 28 meeting full criteria. 08/09 = services 4, 5, 34, 35, 36, 37 completed.
L14: Carbon dioxide emissions	Volume of carbon dioxide emitted by vehicles in Greater Nottingham	Calendar	Tonnes	Joint Plan Are	Base Data	2004	248,000	Actual Figures		2003	2004	2005	2006	2007	2008	2009	2010		**Notes**
										N/A	248,000	**247,000**	**248,000**	**248,000**	**239,000**				Source: Council monitoring
					Target Data	2010	269,000	Trajectory		N/A	248,000	251,500	255,000	258,500	262,000	265,500	269,000		The target equates to an 8% increase and relates to the anticipated 6% increase in traffic on the local authority managed road network and 12% growth on the motorway / trunk road network in the Plan area.
L17: Level of walking	Pedestrian flow on the Primary Pedestrian Route network	Financial	Index based on 2003/5 = 100	City	Base Data	2005/06	100	Actual Figures		2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		**Notes**
										N/A	N/A	**100**	**98.6**	**104.4**	**105.4**	**112.8**			Source: Council monitoring
					Target Data	2010/11	110	Trajectory		N/A	N/A	100	102	104	106	108	110		The baseline is derived from surveys undertaken between 2003 and 2005 on the five pilot Primary Pedestrian Routes. The index represents the aggregated flow of pedestrians on these routes.

indicator on track

Prior to May 2010 some of the indicators in the above table were mandatory whilst others were locally derived. However all the indicators will be included in the LTP3 and therefore are included here.

8 Climate Change Strategies

8.1 Climate Change

10:10 Campaign

Nottingham City Council has signed up to the 10:10 campaign. This is encouraging all sectors in the UK to reduce their carbon emissions by 10% in 2010. We are committed to cutting our carbon by 10%.

Everyone is being encouraged to take part with initiatives on Nottingham City Council's website such as:

It's Everybody's Business - do your 10% be cleaner and greener

Maybe you want to cut your carbon emissions by 10% in 2010, to join 10:10, please click here to visit the 10:10 campaign webpage.

Carbon Footprinting

Do you know your carbon footprint? To calculate your carbon footprint please click here to visit our carbon footprinting pages.

ZERO 2100 Climate Protection Strategy

In 2006 ZER0 2100 a climate protection strategy was produced. This built on the earlier Climate Change action plan. The aims of this strategy are:

- to put the city on a path towards a low carbon future where the needs of the economy and local people are much less dependent on fossil fuels resulting in lowered carbon emissions.
- to ensure that the city is adapted to the inevitable impacts of climate change and is well placed to maximize any benefits.

The Council are now beginning to work on a new climate change plan for the city.

The Nottingham Declaration

The Nottingham Declaration on Climate Change requires councils and public authorities to acknowledge the increasing impact that climate change will have on our community during the 21st century and commits them to tackle the causes and effects of a changing climate in their area of operation. Further information including the content of the declaration can be found by clicking here to visit the Nottingham Declaration on Climate Change website.

Working in Partnership

Nottingham's local strategic partnership in 2008 adopted two National Performance indicators relating to climate change. These are called National Indicator 186 - per

capita reduction in CO2 emissions in the Local Authority area and National Indicator 188 Planning to adapt to Climate Change.

The Health and Environment Partnership

The Nottingham Health and Environment Partnership was launched in March 2007. It is a multi-sector partnership that works strategically in Greater Nottingham to identify and address environmental and economic causes of ill-health, to promote good health, tackle health inequalities and encourage environmental responsibility.

Nottingham Carbon Club

Nottingham is aiming to become one of the UK's First Low-Carbon cities through reducing emissions, raising environmental standards and capturing any economic benefits. In April 2007 the Nottingham Carbon Club was launched. Its main purpose is to assist Nottingham's major businesses help meet the City's commitments to lower carbon emissions.

The Carbon Management Programme

Nottingham City Council is participating in the Carbon Trust Local Authority Carbon Management Programme and is committed to reducing its carbon footprint through this process. This targets carbon reduction in the Council's own buildings, transport, estate, schools and housing functions.

The Council's Carbon Management Plan can be downloaded from the website.

Environmental Management

The development of the Eco-Management & Audit Scheme (EMAS) throughout Nottingham City Council will strengthen action taken to reduce the City's significant environmental impacts. By ensuring that the environmental impacts of all services are audited, monitored and actions taken to ensure continual improvement in this area.

Environmental Policy

Nottingham City Council recognises the need to safeguard and enhance the local and global environment through its own activities and those of our partners. This Local Authority is committed to minimising the Council's adverse environmental impacts while enhancing the quality of life for the people of Nottingham City. An Environmental Policy was adopted in 2008 to outline how we intend to do this.

9 Implementation of Action Plans

Table 9.1a Action Plan Progress - City Centre Air Quality Management Area Action Plan Update June 2010

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
1	**Turning Point Major Integrated Transport Scheme**	Redistribution of cross-city traffic movements with restricted access to Milton Street/Lower Parliament Street Area to achieve high level pedestrian and bus priority	City Council	2002-03	2004-06	Congestion Bus use Pedestrian footfall Area wide traffic mileage		New traffic scheme introduced for Northern quadrant of inner ring road. Pavement widening and enhanced bus waiting facilities	Scheme completed November 2006. 76% reduction in traffic volumes on restricted access streets. Increase in pedestrian footfall. Contributed to 5%increase in bus patronage since 2006	2006	Traffic redistribution within AQMA area. Increased priority for buses without significant traffic displacement impacts.
2	**Parksmart**	Variable message signing and zonal car park direction signing system to direct traffic to available car park parking availability	City Council	2008	2009-10	Congestion	< 1µg/m^3	Business case prepared. Funding secured via LTP. Includes supporting marketing information.	System installed and operational	2010	Will reduce congestion by reducing circulating traffic speculatively searching for a car parking space
3	**Statutory Bus Quality Partner-ship Scheme**	UK's first City Centre wide statutory quality partnership scheme	City Centre	2009	2010	Bus use	< 1µg/m^3	Consultation on scheme requirements with operators completed. Upgrading of bus stop infrastructure.	Scheme implemented. Funding secured for ongoing monitoring arrangements.	2010	Management of all bus services operating in the City Centre including of minimum bus emission standards

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
4	**Connecting Eastside - Phase 1**	Huntingdon St/Lower Parliament St (between Mansfield Road and Southwell Road) to become strategic two-way traffic route with associated public realm improvement package	City Council	2006-08	2009-12	Congestion Traffic volume Pedestrian footfall Cycling trips		Business case prepared. Detailed design complete. Funding package including EMDA and ERDF funding secured.	Under construction	2011	Traffic redistribution within AQMA area. Will encourage more walking and cycling.
5	**Connecting Eastside - Phase 2**	Cranbrook St/Bellar Gate bus priority route and local access	City Council	2006-2010	2012-16	Bus use Public transport accessibility		Preliminary design complete. Funding opportunities being explored.	Scheme to be included in LTP3.	2016	Traffic redistribution within AQMA area. Will increase public transport accessibility to Eastside of the City and thus support sustainable regeneration.
6	**Primary Pedestrian Routes**	Increased priority for pedestrians across inner ring road junctions and upgraded routes from City Centre through regeneration areas.	City Council	2003-2005	2006-11	Pedestrian footfall		Hockley scheme completed in October 2007. Shared surface treatment, public realm and pavement widening from Carlton Street to Cranbrook Street. Includes infilling of all pedestrian subways.	Other routes in development including as part of Connecting Eastside project.	2011	Will encourage more walking and modal change from car.
7	**Commuter cycle routes**	On road cycle route	City Council	2007-10	2008-11	Cycling trips	< 1µg/m^3	£250k allocated per year in LTP. Hucknall	Clifton route currently in	2011	Will encourage more cycling and

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
		improvements includes road space reallocation, cycle lanes and advanced stop lines at junctions						Rd scheme completed in 2009 and Strelley Route in 2010. Clifton route currently in design.	design and subject to consultation.		modal change from car.
8	**Big Track**	Off road circular cycle route via City Centre. Includes Embankment Link and upgrading of footbridge to accommodate cyclists.	British Water-ways	2006-08	2008-09	Cycling trips	< 1µg/m^3	Funding secured from GNTP/EMDA and LTP. Delivery managed by British Waterways.	Construction completed	2009	Will encourage more cycling and modal change from car.
9	**Travel Plans**	Travel plans and business support package for employers.	City Council	2006	2006-11	Travel plans	1µg/m^3	Local Plan requires travel plan for all large-scale development schemes. Travel plan advice and business support package available to employers. TransAct grant scheme available to small and medium sized enterprises for sustainable transport measures.	35 live travel plans in place covering 53,000 employees (approximately 30% of the workforce)	Ongoing	Discourages car use for commuting journeys. Will encourage modal change to more sustainable modes and car sharing.
10	**Station Hub**	Rail capacity improvements and development of modern transport interchange	City Council/ Network Rail/ East Midlands Trains	2006-11	2010-14	Congestion Public transport use	1µg/m^3	Business Case approved. Planning application submitted.	Funding package being finalised.	2014	Will reduce congestion and encourage modal change.

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
11	**NET Phase 2**	Tram network extensions to Clifton and Chilwell via Beeston	City Council	2006-11	2011-14	Tram use Congestion	1-2 $\mu g/m^3$	Programme entry approval secured October 2006. Transport and Work Act Order submitted April 2007. Public Inquiry completed January 2008. Development of scheme design and future procurement arrangements ongoing.	Tenders submitted to design, build, operate and maintain the expanded system. Planned construction to commence in 2011.	2014	Will encourage modal change from car and thus reduce congestion as well as supporting sustainable development.
12	**NET Future Phases**	Other tram network extensions linked to sustainable urban extensions	City Council	2011-16	Post 2019	Tram use Congestion	2 $\mu g/m^3$	Subject to preliminary design and economic assessment.	Sustainable urban extensions and infrastructure requirements identified through Aligned Core Strategy process	Post 2019	Will encourage modal change from car and thus reduce congestion as well as supporting sustainable development
13	**Workplace Parking Levy**	Employers charged for commuter car parking provision (>10 spaces). Revenue generated to fund significant public transport improvements	City Council	2006-12	2012	Congestion Public transport use	< 1$\mu g/m^3$	Business case agreed by DfT. Examination in public completed. Scheme order approved.	Scheme deferred to 2012 due to the economic recession.	2012	Fiscal measure to discourage commuting by car coupled with significant improvements to public transport alternatives.
14	**Park and Ride**	Expansion of Park and Ride capacity	City and County Councils	2006-11	2008-14	Public transport use	< 1$\mu g/m^3$	Queens Drive park and ride facility expansion completed - 2009. New sites and expansion of other sites linked to sustainable urban extensions.	Two large scale sites planned linked to delivery of NET Phase 2.	2014	Reduces congestion through less vehicle movements to the City Centre.

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
15	**A52 Ring Road upgrading**	Upgrading of Ring Road Radcliffe to Clifton Bridge as recommended in the A52 MMS	Highways Agency	Post 2014	Post 2019	Congestion		Feasibility being considered as part of Growth Point programme. Requires prioritisation through Regional Funding Allocations process.	Sustainable urban extensions and infrastructure requirements identified through Aligned Core Strategy process	Post 2019	Reduced congestion by increasing capacity of ring road around the south of the conurbation.
16	**New River Crossing**	New Trent River crossing at Radcliffe. Development of alternative traffic routes to the east of the conurbation.	County Council	Post 2014	Post 2019	Congestion	4-5µg/m^3	Feasibility considered as part of A52 multi-modal study. Requires prioritisation through Regional Funding Allocations process	Sustainable urban extensions and infrastructure requirements identified through Aligned Core Strategy process	Post 2019	Reduced congestion through provision of an alternative route for cross-city traffic movements to the east of the conurbation.

Table 9.1b: Action Plan Progress – Ring Road (Dunkirk) Air Quality Management Area Action Plan Update June 2010

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
1	**Full signalisation of junction**	Derby Road/Ring Road junction	Highways Agency	2009-10	2011	Congestion Bus punctuality	< 1µg/m^3	Consultation on scheme proposals.	Linked to maintenance scheme.	2011	Will help to smooth traffic flow and ease congestion
2	**NET Phase 2**	Network extension to Chilwell via Beeston (including Park and Ride at Bardills) includes stop to serve QMC and interchange with local bus services	City Council	2006-11	2011-14	Tram use Congestion Reduction in monitored nitrogen dioxide levels on Beeston Road	1µg/m^3	Programme entry approval secured October 2006. Transport and Work Act Order submitted April 2007. Public Inquiry completed January 2008. Development of scheme design and future procurement arrangements ongoing.	Tenders submitted to design, build, operate and maintain the expanded system. Planned construction to commence in 2011.	2014	Will encourage modal change from car and thus reduce congestion as well as supporting sustainable development.
3	**Ring Road major**	Integrated transport scheme to increase junction capacity, improve an orbital bus service, upgrade interchange facilities, improve cycle and footway facilities and provide better parking provision for residents	City Council	2006-11	2011-13	Congestion Public transport use Bus punctuality Monitored nitrogen dioxide levels	1µg/m^3	Preliminary design complete. Business case submitted July 2006.	Programme entry approval received in April 2010. Nitrogen dioxide diffusion tube monitoring along ring road initiated January 2010	2014	Will smooth traffic flow and reduce congestion. Improved orbital bus will encourage modal change supported by better interchange facilities that will simplify transfer between radial and orbital bus services without the need to travel via the City centre.

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
4	**Ring Road bus service capacity upgrade**	New larger vehicles to operate 'Medi-link' Ring Road orbital bus service	City Council	2010-11	2012 (now to be delivered as part of Ring Road major scheme)	Bus use	< 1µg/m^3	Upgraded to 10-minute frequency service from March 2007. Free link between two major hospital campuses, NET and Queens Drive Park and Ride facility. Provides interchange with radial public transport services.	Usage up to 23,000 passengers per week	2012	Improves accessibility of two large hospital campuses and encourages modal change. Linked to hospital travel plans.
5	**QMC Inter-change**	Developme nt of bus interchange and in the future tram within the hospital site	City Council	2010-13	2013-14 (linked to delivery of NET Phase 2)	Public transport use	< 1µg/m^3	Being designed as part of NET Phase 2 project.	As NET Phase 2.	2014	Supports public transport integration.
6	**Bus Priority**	Introduction of bus lanes through road space reallocation and other bus priority measures in A6200/A52 and A6005 corridors	County Council	2011-16	Schemes to be programmed for LTP 3 post 2011	Public transport use Bus punctuality	< 1µg/m^3	Subject to preliminary design.	Potential schemes for LTP 3 Implementation Plan	Post 2011	Will encourage modal change from car.
7	**Cycle Links**	Cycle network developmen t	City Council	2008	2009-10	Cycling trips	< 1µg/m^3	Upgrading of commuter cycle routes and ring road cycle facilities. Detailed design complete.	One commuter route per year to be implemented 2009 to 2011.	2011	Will encourage modal change from car.
8	**Bus/ cycle integr-ation project**	Carbon reduction demonstra-tion project involving	City Council	2009	2009-10	Cycling trips Bus trips Carbon reduction	< 1µg/m^3	EMDA funding secured. Interchange points agreed. Equipment ordered.	Installation underway.	2010	Will encourage mode change from car through extending the catchment areas

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
		installation of cycle parking facilities at bus interchange points.									of high frequency bus services.
9	**UCycle project**	Cycling England national demonstration project to encourage more students and staff to cycle to Higher Education sites.	Sustrans	2008-09	2009-11	Cycling trips Proportion of people cycling to University institutions	< 1µg/m^3	Business case prepared leading to a successful bid to Cycling England. Funding for infrastructure also secured from EMDA.	Staff appointed to work with University institutions incl. University Hospital.	2011	Will encourage modal change from car.
10	**Travel Plans**	Including updating of hospital and University plans	City Council	2006	2006-11	Travel plans	1µg/m^3	Local Plan requires travel plan for all large-scale development schemes. Lenton Lane area travel plan developed as a Highways Agency pilot project involving 25 employers covering 7,000 employees in the vicinity of the Ring Road. Queens Medical Centre and Nottingham University staff travel surveys completed.	Lenton Lane area travel plan launched June 2008. Dedicated travel plan website for Lenton Lane area received 1,000 hits on its launch day. Staff car parking reduced at QMC site.	Ongoing	Will encourage modal change from car.

No	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target NO_2 annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
11	**Workplace Parking Levy**	Employers charged for commuter car parking provision (>10 spaces). Revenue generated to fund significant public transport improve-ments	City Council	2006-12	2012	Congestion Public transport use	1µg/m^3	Business case agreed by DfT. Examination in public completed. Scheme order approved.	Scheme deferred to 2012 due to the economic recession.	2012	Fiscal measure to discourage commuting by car coupled with significant improvements to public transport alternatives.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

The 2009 monitoring results show that there were no exceedences of the air quality objectives for PM_{10}, sulphur dioxide, carbon monoxide and benzene. This is consistent with findings reported in previous Review & Assessment reports.

Both diffusion tube and automatic monitoring data show that no exceedences of the nitrogen dioxide annual mean and I hourly mean AQOs were measured outside the Nottingham No.2 and No.3 Air Quality Management Areas 2010.

Within the 2 AQMAs, whilst the 2 roadside continuous monitoring sites measured exceedences of the nitrogen dioxide annual mean objective The NO_2 annual means were 40.4µg/m^3 and 40µg/m^3 at CG NOx (No.2 AQMA) and LS NOx (No.3 AQMA) respectively. Therefore the concentrations were very close to the AQO value of 40µg/m^3.

Exceedences of the annual mean AQO were measured at the majority of the NO_2 diffusion tube sites within the AQMAs.

The 1-hour NO_2 objective was not exceeded at the 2 roadside sites and no annual mean diffusion tube nitrogen dioxide concentration was greater than 60 µg/m^3 which also indicates this objective was unlikely to be exceeded.

There were no exceedences of any of the AQOs for carbon monoxide, benzene, PM_{10} and sulphur dioxide nor of the nitrogen dioxide AQOs outside the AQMAs therefore there is no need to progress to a Detailed Assessment for any of the pollutants.

10.2 Conclusions relating to New Local Developments

Currently there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

For the future, the use of biomass to meet the renewable energy requirements in planning applications and its increasing use in the industrial and domestic sector may have an impact on local air quality. A more detailed consideration of this aspect may be needed in the next Updating and Screening Assessment.

10.3 Other Conclusions

Progress on a number of measures that are in the LTP2 Air Quality Action Plan has been good. Schemes such as:

- Parksmart -variable message signing and zonal car park direction signing system has been installed and is operational. The scheme is expected to reduce congestion by reducing circulating traffic speculatively searching for a car parking space

- Big Track – off road circular cycle route via the City Centre has been completed. It is expected to encourage more cycling and modal change from cars

- Statutory Bus Quality Partnership – the UK's first City Centre wide statutory quality partnership scheme has been implemented. This covers the management of all bus services operating in the City Centre including minimum bus emission standards.

The AQAP also includes proposals for NET (Nottingham Express Transit) Tram network extensions to encourage modal change from car and reduce congestion. The NET line Phase 2 was also one of the planning applications considered for this report. It has the potential to impact positively on air quality once the lines are in use. However final approval for the scheme to go ahead has not yet been given.

The majority of the Local Transport Plan 2006/07-2010/11 (LTP2) indicators linked to Air Quality Action Plan measures are on track with the yearly projections. These include LTP7:Congestion – average journey time the carbon dioxide indicator and L14: Carbon dioxide emissions – volume of carbon dioxide emitted by vehicles in Greater Nottingham.

Air quality issues will be an integral part of the ongoing work being undertaken by Nottingham City Council to develop and implement the Local Development Framework for land use planning.

For the LAQM process currently there are no AQOs for ozone but it is a pollutant of concern because of its potential to affect human health and ecosystems. It has been measured at the Nottingham Centre national network monitoring station since 1996. The AURN 1996 -2009 data show increasing ozone concentrations which is similar to the national trend at urban background sites.

10.4 Proposed Actions

The 2009 monitoring data has not identified the need to progress to a Detailed Assessment (DA) for any pollutant.

As a consequence of the DA 2009 and the subsequent Variation Orders for the 2 AQMAs, new monitoring sites have been initiated i.e. NO_2 diffusion tubes around ring road and an automatic NOx site measuring NO_2, NO and NOx in the northern part of Nottingham No.2 AQMA 2010.

The AQMS automatic monitoring site in the Dunkirk area was de-commissioned at the end of December 2009. Since 2004 the annual mean nitrogen dioxide concentrations at the site have been consistently 5 to 6 µg/m3 below the AQO value. The site is not within the Nottingham No.3 AQMA 2010.

No exceedences of the NO_2 AQOs were measured outside the AQMAs. Exceedences of the annual mean NO_2 AQO were measured at some sites within the 2 AQMAS. Therefore the AQMAs cannot be revoked and it is appropriate to maintain their current boundaries.

There were no exceedences of any of the AQOs for carbon monoxide, benzene, PM_{10} and sulphur dioxide.

The conclusion from the work undertaken for this report is that there is no need to progress to a Detailed Assessment for any pollutant.

What happens next

The next steps that Nottingham City Council will take to fulfil its LAQM duties are:

- Submit a Further Assessment for nitrogen dioxide - the completion of the DA 2009 and subsequent variation orders for the AQMAs means a Further Assessment for NO_2 has to be undertaken. This is a statutory requirement and the legislation requires that this occurs within 12 months of the AQMA designation (or variation). Therefore it is intended that the Further Assessment in respect of nitrogen dioxide will be completed by 30 May 2011.

- Submit a 2011 Progress Report by 30 April 2011 in accordance with the Review and Assessment timescales outlined in the Technical Guidance LAQM.TG(09).

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The Pollution Prevention and Control Act 1999

Appendix A:

Diffusion Tube and PM_{10} Data Adjustment and QA/QC Information

A-1 NO_2 Diffusion Tube Bias Adjustment

A-2 PM_{10} Data Adjustment

A-3 QA/QC for Automatic Monitoring

A-4 QA/QC for NO_2 Diffusion Tube Monitoring

Appendix A: Diffusion Tube and PM_{10} Data Adjustment and QA/QC Information

A-1 NO_2 Diffusion Tube Bias Adjustment

Nottingham City Council's diffusion tubes are supplied and analysed by Gradko International, Hampshire. The tubes are prepared using a 20% solution of triethanolamine (TEA) in de-ionised water and are exposed on site for one month before being returned for laboratory analysis.

The R&A Helpdesk Database 2009 bias adjustment factor for Gradko 20% TEA in water tubes = 0.92. This figure is the average of 11 studies and was taken from Spreadsheet Version Number: 03/09.

Diffusion tube precision was good for 9 of the11 studies used to derive the national bias adjustment factor. Tube precision is categorised as 'good' "where the coefficient of variation (CV) of triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than10%". (LAQM.TG(09))

Factor from Local Co-location Studies (if available)

Throughout 2009 triplicate diffusion tubes were co-located at 3 continuous analyser sites.

Table A-1 gives the bias adjustment factors for our co-location study for the 3 sites; the figures in the table have been calculated from 12 months' ratified data (January to December 2009) and the averaged bias adjustment factor = 0.913.

Nottingham City Council's co-location data has been entered in the R & A Database site.

Table A-1 Nottingham City Council's Bias Adjustment Factor

Site	Site Type	Cm NO_2 µg/m^3	Dm NO_2 µg/m^3	Bias Adjustment Factor, A	*Data Capture % Cm	Dm	Precision (CoV) %
AURN, Clinton St East	Urban Centre	35	37	0.94	97	97	8
CG NOx, Carter Gate	Roadside	41	46	0.89	98	97	7
LS NOx, Lace Street	Roadside	41	45	0.91	99	86	4
Averaged bias adjustment factor				**0.913**			

12 months data January to December 2009

Cm = chemiluminescence (continuous) analyser measurement

Dm = diffusion tube measurement (average of 3 tubes)

Bias Adjustment Factor =Cm/Dm

CoV = Coefficient of variation

Discussion of Choice of Factor to Use

The 2009 national bias adjustment factor and the local adjustment factor were similar i.e. 0.92 and 0.913 respectively.

The local factor was used to adjust the diffusion tube values because Nottingham City Council's co-located tubes were exposed at sites that are representative of the majority of the single tube locations and; the local data had good 'precision', good overall data capture and the co-efficient of variation was low at each of the sites. This choice is consistent with advice given in LAQM.TG(09).

The closeness of the adjustment factor values means there is no particular positive or negative impact by using the local factor.

The 2009 diffusion tube unbiased monthly nitrogen dioxide concentrations are given in Appendix B Table B-1.

A-2 PM_{10} Data Adjustment

The Air Quality Objective for PM_{10} is quoted as a gravimetric measurement and reflects the European Standard for the determination of PM_{10}. The UK Equivalence Programme for Monitoring of Particulate Matter Report found that in order to meet the equivalence criteria, AURN TEOM units would have to be retro-fitted with the Filter Dynamic Measurement System (FDMS). This provides particulate matter (PM) measurements that closely correlate with gravimetric PM mass concentrations, as measured with the EU Reference Sampler.

The FDMS system accounts for volatile particulate matter(PM) that may not be detected by earlier (non equivalent) TEOM models.

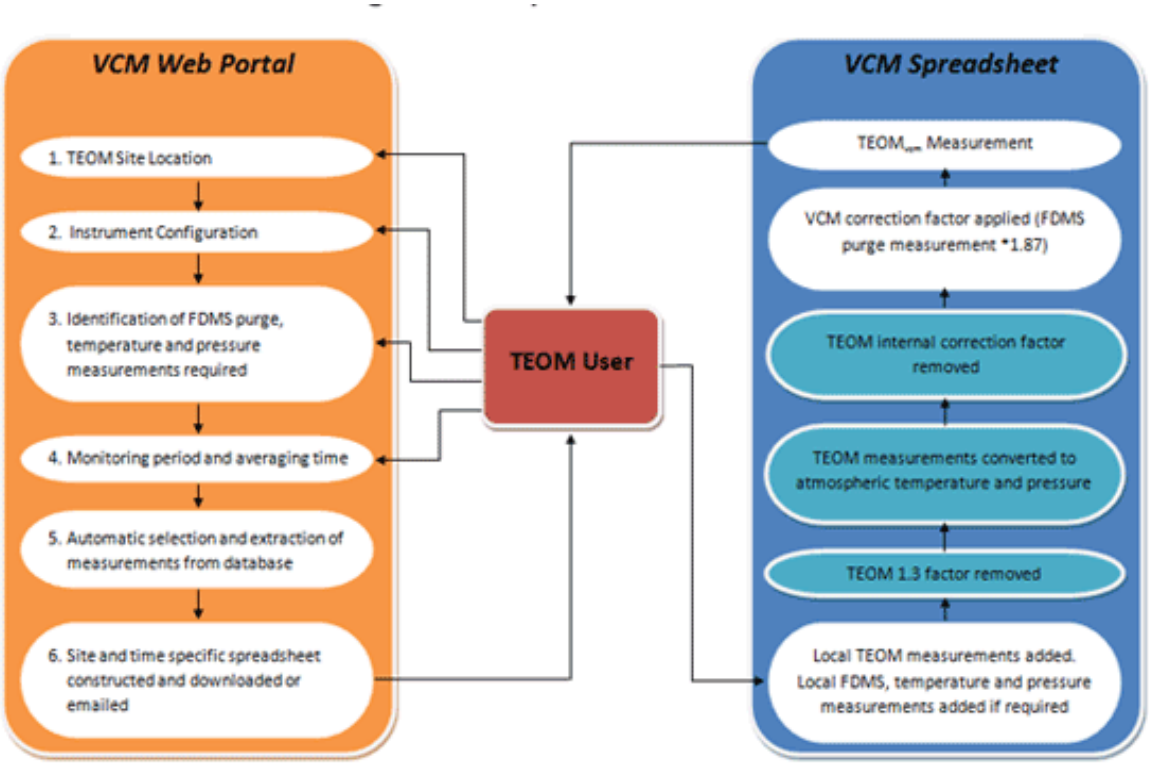
Alternatively, the Volatile Correction Model (VCM) to correct non-FDMS TEOM measurements has been developed to allow the continued use of existing TEOM systems, used extensively by Local Authorities, without the necessity of expensive FDMS upgrade.

ERG, King's College, London has developed a VCM web portal (funded by Defra) - www.volatile-correction-model.info/. The following information about the Volatile Correction Model VCM is taken from the web site.

It has been designed for users of TEOM PM_{10} measurements and allows the correction of TEOM measurements for the loss of volatile components of particulate matter that occur due to the high sampling temperatures employed by this instrument. The resulting corrected measurements have been demonstrated as equivalent to the gravimetric reference equivalent.

The VCM works by using the volatile particulate matter measurements provided by nearby FDMS instruments (within 130 km) to assess the loss of PM_{10} from the TEOM; this value is then added back onto the TEOM measurements.

Figure A-1 Flow chart describing data manipulation in the VCM web portal:



The information shown on the next page is taken from LAQM. TG(09) and outlines the steps taken to apply the VCM model

Box 3.4: Application of the Volatile Correction Model

A VCM web portal is available through the national air quality archive at www.volatile-correction-model.info/Default.aspx. This allows local authorities to download geographically specific correction factors to apply to the TEOM PM_{10} results.

There are a number of steps that need to be taken to apply the VCM, as the default settings for the TEOMs used in the UK contain a "US EPA correction factor" and are reported at standard temperature and pressure (STP).

Step 1: Remove the default "US EPA correction factor" from the measured TEOM PM_{10} data.

TEOM instruments, as supplied by the manufacturer, include a default US EPA adjustment that is embedded into the software. This adjustment factor is:

Reported TEOM PM_{10} ($\mu g/m^3$) = (TEOM PM_{10} at STP ($\mu g/m^3$) * 1.03) + 3 $\mu g/m^3$

The TEOM PM_{10} concentration at STP, with the US EPA adjustment factor removed, is given by:

$$TEOM_{STP}\,PM_{10} = \frac{TEOM\,PM_{10} - 3}{1.03}$$

Step 2: Correct the measurements to atmospheric temperature and pressure

The TEOM is configured to report measurements at a standard temperature (25°C) and a standard pressure (1 atm). This differs from the European position, which reports at ambient conditions and this difference therefore increases uncertainty in the comparison with the European reference method. By using measurements of ambient temperature and pressure, the temperature and pressure correction can be removed from the TEOM measurements at STP to provide an ambient temperature and pressure TEOM measurement ($TEOM_{ATP}$) using the following equation:

$$TEOM_{ATP}\,PM_{10} = \left[\frac{TEOM\,PM_{10} - 3}{1.03}\right] x\ \frac{1}{P}\ x\ \frac{T + 273}{273}$$

Where P = ambient pressure in atmospheres and T = ambient temperature in °C

Step 3: The Regional Purge Concentration

The regional purge concentration is the mean of up to three of the nearest Automatic Urban and Rural Network (AURN) FDMS instruments within the model domain. Current evidence suggests that the model domain extends to approximately 130 km from the measurement site. This is multiplied by 1.87 to account for the additional loss of volatile material from the TEOM filter, which is maintained at 50°C, compared to the FDMS filter, which is maintained at 30°C. This factor has been derived from TEOM and FDMS co-location studies.

Step 4: The calculating the $TEOM_{VCM}$ concentration

Steps 1 and 3 can be combined into the equation below.

$$TEOM_{VCM}\,PM_{10} = \left\{\left[\frac{TEOM\,PM_{10} - 3}{1.03}\right] x\ \frac{1}{P}\ x\ \frac{T + 273}{273}\right\} - 1.87\ x\ Regional\ Purge\ Concentration$$

These calculations will be undertaken by the VCM web portal to provide a time series of daily or hourly correction factors that can then be applied to TEOM PM_{10} measurements as they are recorded by the instrument.

Nottingham City Council's AQMS PM_{10} data have been corrected using the Volatile Correction Model web portal which allows the user to input the requisite information; the calculation of the corrected hourly or daily PM_{10} data is done automatically and is then available as a downloadable Microsoft Excel spreadsheet.

A-3 QA/QC for Automatic Monitoring

Quality Control, Maintenance, Calibration

AURN Site

The analysers at the AURN site are subject to a four weekly calibration regime. The calibrations are undertaken by a trained local site operator (LSO) and conducted in accordance with the Local Site Operators' Manual. Nottingham City has 3 trained LSOs who are audited as to their performance on an on-going basis.

The LSO changes the filters for the TEOMs and FDMS and cleans the TEOM heads approximately every 12 weeks, in accordance with the Local Site Operators Manual, when requested by the Central Management and Co-ordination Unit (CMCU).

The equipment is fully serviced every six months. In 2009 this was undertaken by Casella Measurement, Bedford.

The site is audited by AEA Energy & Environment on a six monthly basis.

AQMS, CG NOx and LS NOx Sites

At Nottingham City Council's AQMS, CG NOx and LS NOx sites calibrations are carried out fortnightly. The calibrations, using zero air and span gases, are undertaken by the same LSOs as those for the AURN site and are conducted using the same principles and procedures as given in the AURN LSO Manual.

At the AQMS site, the LSO changes the TEOM filter and cleans the TEOM head every 4 weeks.

The equipment is fully serviced every six months by Casella Measurement, Bedford.

Calibration Gas Traceability

AURN Site

Calibration gases used in the AURN are supplied by AIR Liquide who have demonstrated compliance with relevant quality control procedures in the preparation of gas mixtures. The gas mixtures are certified by AEA Energy & Environment.

AQMS, CG NOx and LS NOx Sites

Calibration gases used in the AQMS, CG NOx, and LS NOx monitoring sites are supplied by AIR Liquide who have demonstrated compliance with relevant quality control procedures in the preparation of gas mixtures. The gases are supplied with a certificate of analysis.

Data Collection and Processing

AURN Site

The AURN station's data logger is interrogated on an hourly basis by Bureau Veritas the Central Management and Co-ordination Unit (CMCU). The data obtained is validated by CMCU and passed to the Data Dissemination Unit (DDU).

Information about the AURN station and available data can be found on the internet at www.airquality.co.uk

AQMS, CG NOx and LS NOx Sites

For Nottingham City Council's sites all data collection, validation and ratification is carried out by the Council's Noise & Pollution Control team.

Throughout 2009, data from the AQMS, CG NOx and LS NOx sites was polled remotely (AQMS via a computer logger, CG NOx & LS NOx directly from the analysers) and collected as 15 minute averages using Envista ARM data collection software. The data have been scaled and converted into hourly or other values using the Envista ARM data management system

The software allows users to remotely view, analyse, report and distribute environmental quality data. Manipulation of raw data to verified data can be conducted in a structured approach.

Data validation is carried out and involves screening the scaled values to identify unusual measurements, errors due to equipment failure etc. and flagging them for further investigation.

Data ratification is carried at approximately 2 monthly intervals. This involves looking at the data more closely and includes:

- examination of calibration records to ensure correct application of calibration factors;
- examination of data for other pollutants and monitoring sites to highlight any anomalies;
- deletion of data shown from chart or other records to be spurious, for example, spikes generated by the analyser;
- correction of any baseline drift as indicated by examination of daily automatic calibration records.

Once this process has been carried out and data has been verified, amended or rejected as appropriate the data is ratified. This final data set is used for the R & A process.

A-4 QA/QC for NO_2 Diffusion Tube Monitoring

Gradko International supply and analyse Nottingham City Council's diffusion tubes. The organisation is UKAS accredited and is assessed annually for compliance to ISO 17025 and participates in other proficiency schemes.

Gradko confirmed that:

- their procedures have been amended to follow the guidance issued on behalf of Defra (AEA Energy & Environment, Feb 2008) relating to the preparation, extraction, analysis and calculation procedures for passive NO_2 diffusion tubes

Gradko participate in a number of QA/QC monitoring systems to demonstrate satisfactory performance i.e.:

- The Workplace Analysis Scheme for Proficiency (WASP) programme to ensure uniformity in data throughout the year.
- The monthly field inter-comparison exercise with other laboratories to enable assessment of bias and precision undertaken by AEA Energy & Environment.
- An external QC scheme to check solutions run by AEA Energy & Environment.

WASP

This involves monthly analysis of doped tubes, allowing assessment of overall uniformity of data throughout the year. Performance scores i.e. Z-score are assigned to the reported analysis results, on the basis of their difference from the known concentration of the analyte and the actual standard deviations.

Z-score Results are classified as follows:
Satisfactory < +/-2
Questionable (warning) > +/-2 – < +/- 3
Unsatisfactory > +/-3

Each participating laboratory's results are analysed by AEA Energy & Environment and combined to give an annual relative standard deviation. If this value is greater than + 15% of the Performance Target then the laboratory's performance for the year in the WASP scheme will be deemed unsatisfactory. Only laboratories that remain in the WASP scheme are used for analysing tubes from the National NO_2 diffusion tube non-automatic network.

Table A-2 Gradko 2009 WASP NO_2 Diffusion Tube Performance Results

Date	WASP Round Number	NO_2 Reference Value µg NO_2	NO_2 Measured Value µg NO_2	Z Score	Laboratory Performance
Jan 2008	104	-2.02	1.85	-0.7	Satisfactory
		-1.22	1.20	-0.1	Satisfactory
Mar 2008	105	-1.68	-1.62	-0.4	Satisfactory
		-0.96	-0.92	-0.5	Satisfactory
Jul 2008	106	-1.84	-1.88	0.3	Satisfactory
		-1.42	-1.34	-0.8	Satisfactory
Jan 2009	107	-2.03	-1.87	-1.1	Satisfactory
		-2.20	-1.99	-1.4	Satisfactory

Data supplied by Gradko International March 2009

Annual Field Intercomparison

Each participating laboratory is asked to provide a number (typically 3) diffusion tubes for exposure, plus one travel blank. The tubes are exposed at a suitable location for a period of around one month, before being returned to the laboratories for analysis. The exposure site will be co-located with a chemiluminescent analyser. Laboratories are expected to perform within 20% of the reference concentration (usually that obtained by the chemiluminescent analyser).

The 2009 Gradko results of AEA Energy & Environment Intercomparison NO_2 diffusion tube network exercise are given in Table A-3 next page. The results show that both precision and accuracy were good for this laboratory.

Table A-3 2009 Gradko / AEA Energy & Environment Intercomparison NO_2 Diffusion Tube Network

All data supplied by Gradko International

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
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	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	07/01/2009	04/02/2009	130.2	127.3	128.2	129	1.5	1	3.7	114	99.1	Good	Good
2	04/02/2009	04/03/2009	102.7	116.8	112.0	111	7.2	7	17.9	97	98.1	Good	Good
3	04/03/2009	31/03/2009	107.7	117.1	118.6	114	5.9	5	14.7	112	99.4	Good	Good
4	31/03/2009	29/04/2009	99.0	98.1	95.9	98	1.6	2	3.9	103	99.4	Good	Good
5	29/04/2009	03/06/2009	88.9	81.6	96.1	89	7.2	8	18.0	107	99.5	Good	Good
6	03/06/2009	01/07/2009	91.2	85.5	93.9	90	4.3	5	10.7	100	99.6	Good	Good
7	01/07/2009	29/07/2009	100.9	113.3	115.5	110	7.8	7	19.5	117	99.6	Good	Good
8	29/07/2009	02/09/2009	153.1	139.1	153.1	148	8.1	5	20.1	115	99.2	Good	Good
9	02/09/2009	30/09/2009	97.2	97.9	95.3	97	1.3	1	3.3	84	95.1	Good	Good
10	30/09/2009	04/11/2009	167.5	148.1	146.1	154	11.8	8	29.3	109	99.3	Good	Good
11	04/11/2009	02/12/2009	159.6	149.4	158.7	156	5.6	4	14.0	126	99.6	Good	Good
12	02/12/2009	07/01/2010	152.1	155.1	156.3	154	2.2	1	5.4	103	99.5	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

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

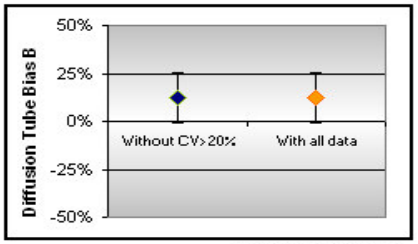
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Gradko water - Intercomp 2009

Precision	12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.89 (0.79 - 1.01)
Bias B	13% (-1% - 26%)
Diffusion Tubes Mean:	121 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	107 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	108 (95 - 122) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.89 (0.79 - 1.01)
Bias B	13% (-1% - 26%)
Diffusion Tubes Mean:	121 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	107 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	108 (95 - 122) μgm^{-3}



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Version 03 - November 2006

Appendix B

Table B-1 2009 Diffusion Tube Unbiased Monthly Nitrogen Dioxide Concentrations (µg/m^3)

Site Id	Location	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Raw Mean µg/m^3
C	Clifton Boulevard	42	51	33	37	25	30	21	26	29	36	37	34	33.6
D	Beeston Road (1)	65	69	62	56	45	18	40	40	47	57	54	57	50.8
F	Beeston Road (2)	54	75	59	61	59	23	55	26	47	62	63	50	52.8
G	Beeston Road (4)	59	52	49	42	38	25	38	31	37	44	45	48	42.3
I	Derby Road (1)	50	35	47	37	25	26	31	29	31	37	38	37	35.2
X	Western Boulevard	41	40	49	37	29	19	36	31	31	40	40	41	36.1
K	Castle Boulevard	65	50	44	49	45	48	39	35	44	45	47	-	46.4
K2	Castle Boulevard (2)	53	47	50	41	32	34	31	38	36	42	41	46	40.9
M	Canning Terrace	62	52	66	56	53	38	44	40	49	58	51	47	51.2
N	Upper Parliam't St.	68	63	56	53	50	30	50	41	46	62	56	59	52.8
O	Shakespeare St.	67	51	62	50	46	27	50	40	47	54	49	60	50.1
O2	Shakespeare St.(2)	71	70	67	57	54	40	54	43	63	62	-	51	57.4
P	Mansfield Road	70	56	57	55	43	22	44	37	43	55	53	56	49.1
P2	Mansfield Road (2)	58	58	54	37	-	35	48	38	39	46	50	51	46.7
Q	Woodborough Rd	70	56	64	60	49	49	48	43	40	58	58	55	54.1
Y	Beck Street	62	54	57	50	46	38	45	38	49	59	54	62	51.2
S	Carter Gate	66	51	54	47	46	23	45	43	39	51	44	49	46.5
T	Queen's Road	76	66	64	48	46	53	45	54	44	68	62	59	56.9
T2	Queen's Road (2)	78	69	63	56	57	38	48	50	55	63	57	53	57.2
Z	Kinglake Place	44	38	43	34	28	28	26	24	29	37	38	45	34.4
U	Trent Bridge	53	53	49	50	34	21	28	28	30	39	33	38	38.0
V	Bentinck Rd	53	43	47	34	27	29	35	35	34	43	43	34	38.0
A	Ilkeston Road	46	36	36	31	21	23	23	23	25	31	33	33	29.9
W	Ransom Drive	7	10	9	9	4	4	6	2	4	7	6	8	6.3
B	Noel Street Baths	44	31	29	26	17	12	17	19	18	27	30	29	25