



# 2012 Air Quality Action Plan Progress Report for Bolsover District Council

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

October 2012

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<b>Report Reference number</b>	BDC/ACTION PLAN PROGRESS REPORT 2012
<b>Date</b>	October 2012

## **Executive Summary**

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, provides a national framework for air quality management. The Air Quality Regulations 2000, as amended in 2002, prescribe air quality objectives and the dates by which they must be met for seven key pollutants.

Part IV of the Environment Act 1995 requires Local Authorities to review and assess local air quality. This is a multi-staged process with each stage increasing in complexity. The purpose of this process is to identify areas where it is unlikely that air quality objectives will be achieved by the due date. Where exceedences are identified, the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

This report constitutes the annual progress report on the implementation of the Air Quality Action Plan which is in place for the Air Quality Management Area at South Normanton. It concludes that levels of nitrogen dioxide have decreased in 2011 compared to 2010 however the annual mean air quality objective is still marginally exceeded in the AQMA. The Council will continue to monitor in order to assess levels against the air quality objective.

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# 1 Introduction

## 1.1 Description of Local Authority Area

Bolsover District Council is located in the northeast corner of Derbyshire. The northern border is shared with South Yorkshire and to the east lies Nottinghamshire. The city of Sheffield lies to the northwest and Nottingham is located to the southeast. The District is predominantly a rural area containing four small towns and several villages. The main land use is agriculture plus there are numerous small and medium sized commercial and industrial business estates within the District.

The M1 motorway runs through the District with junctions 28 and 30 lying within the boundary. A map of the district boundary is shown in Figure 1.1.

Figure 1.1



## 1.2 Purpose of Report

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. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Action Plan Progress Report is to report progress on implementing the Council's Air Quality Action Plan which was produced in August 2004 <http://www.bolsover.gov.uk/air.html>. This report has been produced in accordance with the guidance published by the Department for Environment Food and Rural Affairs (Defra) Policy Guidance (PG09) and Technical Guidance LAQM.TG (09).

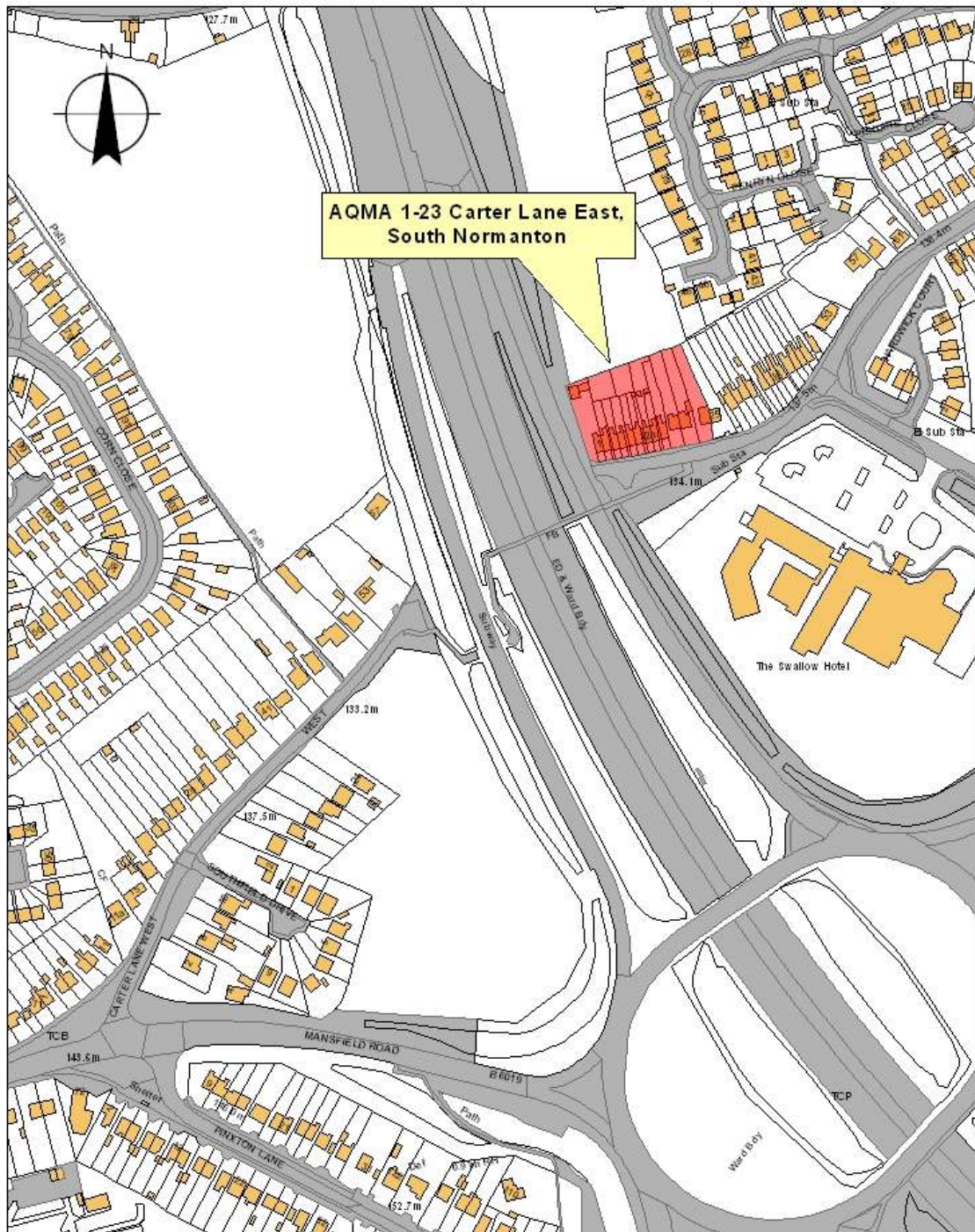
## 2 Implementation of Air Quality Action Plan

The first round of review and assessments resulted in the designation of an Air Quality Management Area (AQMA) in December 2001, the boundary of which was extended in July 2004 following the Further Assessment. The AQMA was designated due to a predicted exceedence of the annual mean objective for nitrogen dioxide. The AQMA is located adjacent to junction 28 of the M1 motorway and consists of 12 residential dwellings, 1 to 23 Carter Lane East, South Normanton as shown in Figure 2.1.

The findings of the Further Assessment (Stage 4 assessment) concluded that the dominant source of nitrogen dioxide in the AQMA is from motorway traffic. Control of motorway traffic is outside the Council's remit and lies with the Highways Agency.

Progress with the Air Quality Action Plan (published August 2004, final report) is shown in Table 1.1. Progress is reported annually therefore additions since the last report published in November 2011 have been highlighted in bold.

Figure 2.1 Air Quality Management Area, Carter Lane East, South Normanton



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**TABLE 1.1 – AIR QUALITY ACTION PLAN – SOUTH NORMANTON AQMA**

ACTION	TIMESCALE	PROGRESS WITH ACTION	OUTCOME TO DATE/COMMENTS
<p>Close consultation with and lobbying the Highways Agency re: M1 widening scheme</p>	<p>Dependent upon submission of scheme</p> <p>Contract 1 (J25-J28) completed June 2010</p>	<p>Secretary of State announced in April 2004 that M1 Junction 21 to 30 widening scheme had been added to Highways Agency Targeted Programme of Improvements. Noise and Air Quality Subgroup set up by ARUP (appointed by Highways Agency) with purpose of providing opportunities for detailed specialist and technical discussion on noise and air quality issues.</p> <p>Highways Agency announced in Spring 2009 that the M1 J28-31 is to be taken forward as part of the Roads Programme for Improvements; to investigate the benefits of Dynamic Hard Shoulder Running.</p> <p>The Stage 2 Assessment of Air Quality Impacts of the Improvement Options for J28 – 31, was conducted from March 2009 – September 2009.</p> <p>J28- J31 scheme changed. Scheme now proposed is that of a Managed Motorways scheme from J28-J31 to make better use of the existing motorway.</p> <p>In October 2010 the Transport Secretary prioritised the project as one of fourteen to proceed into construction before April 2015. In April 2011 the Roads Minister confirmed the scheme programme with a start date on site in either the financial year 2013/2014 or 2014/2015. April 2011 – Highways Agency appointed ATKINS to replace ARUP to progress the scheme design</p>	<p>Initial meeting held November 2004. Air Quality Assessment to be undertaken using DMRB Screening and detailed dispersion modelling. Further meetings held April 2005 and March 2006.</p> <p>Environmental Statement published March 2006, concluded that all national objectives and EU limit values are predicted to be met in the relevant years both with and without the proposals in place, no incorporated mitigation is proposed.</p> <p>Further meetings held January and November 2007. Work on Contract 1(J25-28) commenced October 2007. Work completed June 2010.</p> <p>Stage 2 Assessment of Improvement Options underway. Junction 28 improvements being considered.</p> <p>Next Noise and Air Quality Subgroup to be scheduled for the Autumn 2009 to update members on recent activity.</p> <p>Noise and Air Quality Sub-group held June 2010 to discuss assessment methodology for impact assessment. Detailed dispersion modelling using ADMS-Roads will be undertaken as a minimum.</p> <p>Next sub-group meeting scheduled for Autumn 2010.</p> <p>October 2011 – At this stage the Highways Agency do not anticipate that the project will have significant environmental effects.</p> <p>Detailed air quality and noise assessment to be undertaken summer 2012.</p>



		and environmental assessment work and to produce traffic model. New consultants to be appointed Autumn 2011 for developing the detailed design for the project and completing outstanding environmental assessment work. <b>Consultants, Mouchel, commissioned by Highways Agency in November 2011 to develop a 'Managed Motorway' scheme between Junction 28 and 31 of the M1.</b>	October 2011 – Highways Agency decision not to continue with sub groups of the Environmental Forum due to scope of the project being significantly reduced compared to the original widening proposals. However new consultants to maintain dialogue with stakeholders in respect of key design and assessment issues. <b>Consultants, Mouchel issue Environmental Scoping Report to consultees, April 2012.</b>
Liaise and work with Highways Agency	Ongoing	As Above	Diffusion tube monitoring data for AQMA provided to ARUP July 2005. Participation in Highways Agency diffusion tube survey from March 2006. Liaise with ARUP regarding locating a continuous analyser within AQMA. <b>Continuous monitoring and diffusion tube monitoring undertaken by ARUP on behalf of the Highways Agency ceased in January 2011. Diffusion tube monitoring undertaken by RPS on behalf of the Highways Agency ceased in April 2011. BDC monitoring data provided to consultants Mouchel January 2012.</b>
Continue to monitor NO <sub>2</sub> levels within and adjacent to the AQMA using existing diffusion tube network	Ongoing	Ongoing Continuous monitor installed by ARUP in garden of 1 Carter Lane East, measuring NO <sub>x</sub> and ozone. Triplicate NO <sub>2</sub> diffusion tubes also co-located at the site by ARUP, RPS and BDC.  Installation of NO <sub>2</sub> diffusion tube transect along Carter Lane West on adjacent side of motorway.	BDC monitoring results for AQMA shared with ARUP (2006 to end of ARUP monitoring period).  Potential implications for exceedence of annual mean (2010) objective at residential locations to the west of the M1. <b>Additional diffusion tube monitoring site set up on Carter Lane West in February 2011 as a result of this exceedence.</b> <b>Monitoring results for 2011 showed a decrease in the annual mean for nitrogen dioxide on Carter Lane West to levels below the air quality objective. See section 2.1.</b>

<p>Review existing diffusion tube network and extend in order to monitor effects of noise barrier on pollutant levels.</p>	<p>Immediate</p>	<p>Additional diffusion tube located at a receptor, 3 Carter Lane East, South Normanton, March 2004. Diffusion tube at site 5 re- located to 1 Carter Lane East, South Normanton in November 2008.</p>	<p><b>Monitoring results presented in section 2.1</b></p>
<p>Consultation with other relevant groups, departments, agencies, neighbouring Local Authorities</p>	<p>Ongoing</p>	<p>Ongoing</p>	<p>Respond to internal Planning consultations on air quality issues. Liaison with Derbyshire Local Authorities through meetings held by Derbyshire Chief Environmental Health Officers Environmental Protection Group (DEPG). Liaison with the Highways Agency and Derbyshire County Council is a work plan item for the group.          Invitation sent to Highways Agency to attend a DEPG meeting, August 2011. <b>David Griffiths, Senior Environmental Advisor for the Highways Agency attended the DEPG meeting held in March 2012 to give a presentation on the proposed managed motorways for the M1 junction 28 to 31.</b></p>

## 2.1 Diffusion Tube Monitoring

Bolsover District Council undertakes nitrogen dioxide (NO<sub>2</sub>) monitoring in and around the AQMA. Details of diffusion tube bias adjustment and QA: QC are shown in Appendix A. Prior to 2011, diffusion tube monitoring was also undertaken by consultants RPS and ARUP on behalf of the Highways Agency. However it was reported in the 2011 Air Quality Progress for Bolsover District Council <http://www.bolsover.gov.uk/air.html> that the Council were informed by ARUP in January 2011 that both the continuous monitoring and diffusion tube monitoring were to cease due to funding cuts on the M1 Managed Motorways Scheme. Monitoring by RPS also ceased in April 2011. Consequently the only monitoring data available for 2011 is that undertaken by the Council. In the absence of a local co-location study the annual mean results have been bias adjusted using the national bias adjustment factor.

Diffusion tube monitoring is undertaken at the sites listed in Table 2.1. The location of the sites is shown in Figure 2.3.

**Table 2.1 Location of diffusion tube monitoring sites**

Site ID	OS Grid Ref	Distance to kerb of nearest road	Within AQMA?
5 ( triplicate tubes)	X 445241 Y 356520 re-located in Nov'08 to: X 445241 Y 356536	6m from M1 slip road (southbound), 13m when re-located inside the AQMA Nov '08	Y from Nov'08 onwards
15	X 445245 Y 356539	17m M1 slip road (southbound)	Y
20	X 445278 Y 356540	50m M1 slip road (southbound)	N 6m to building facade
21	X 445321 Y 356567	100m M1 slip road (southbound)	N
10	X 445140 Y 356458	20m M1 slip road (northbound)	N

Site 10 is a new site which was set up in February 2011 in response to the following issues which were detailed in the 2011 Air Quality Progress Report:

- Monitoring undertaken by consultants, ARUP, on behalf of the Highways Agency identified an exceedence of the annual mean air quality objective at this location in 2010 (51µg/m<sup>3</sup> using the bias adjustment factor from ARUP co-location study, 40.3 µg/m<sup>3</sup> using the national bias adjustment factor).
- Outline planning permission was granted in July 2010 for a residential development adjacent to the northbound carriageway of the M1 to the north of Carter Lane West thereby introducing new receptors.

- Potential new exposure on Carter Lane West due to the re-development of a previously derelict property.

Results of the diffusion tube monitoring for 2011 are shown in Table 2.2 .Results of monitoring for 2000 to 2011 are shown in Table 2.3. Table 2.2 shows that the annual mean air quality objective of 40 µg/m<sup>3</sup> has been exceeded within the AQMA in 2011. However the exceedence is marginal. The results of the monitoring on Carter Lane West, site 10, show that levels have decreased in 2011 compared to 2010 and are below the annual mean objective. It is now widely recognised that NO<sub>2</sub> levels were elevated nationally in 2010.

The results in Table 2.3 show that NO<sub>2</sub> concentrations in 2011 are some of the lowest recorded during the monitoring period 2000 to 2011. Trends in NO<sub>2</sub> are shown graphically in Figure 2.2. Site 20 shows a marginally higher level than sites 5 and 15 despite being located at a greater distance from the M1 carriageway and slip road. This could be due to air flows being affected by the noise barrier or due to the fact that the diffusion tubes at sites 5 and 15 are located on the building façade whereas site 20 is located on a lamppost outside the curtilage of the properties. Concentrations of nitrogen dioxide at site 21 continue to be significantly lower and remain below the air quality objective, which is expected due to the increasing distance from the pollutant source.

**Figure 2.2 Trends in Annual Mean Nitrogen Dioxide Concentrations.**

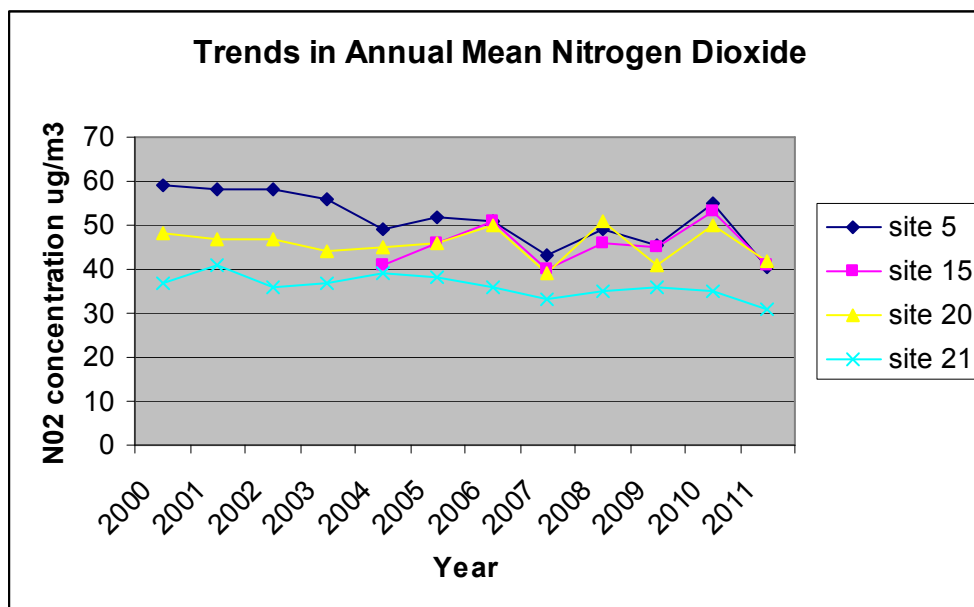
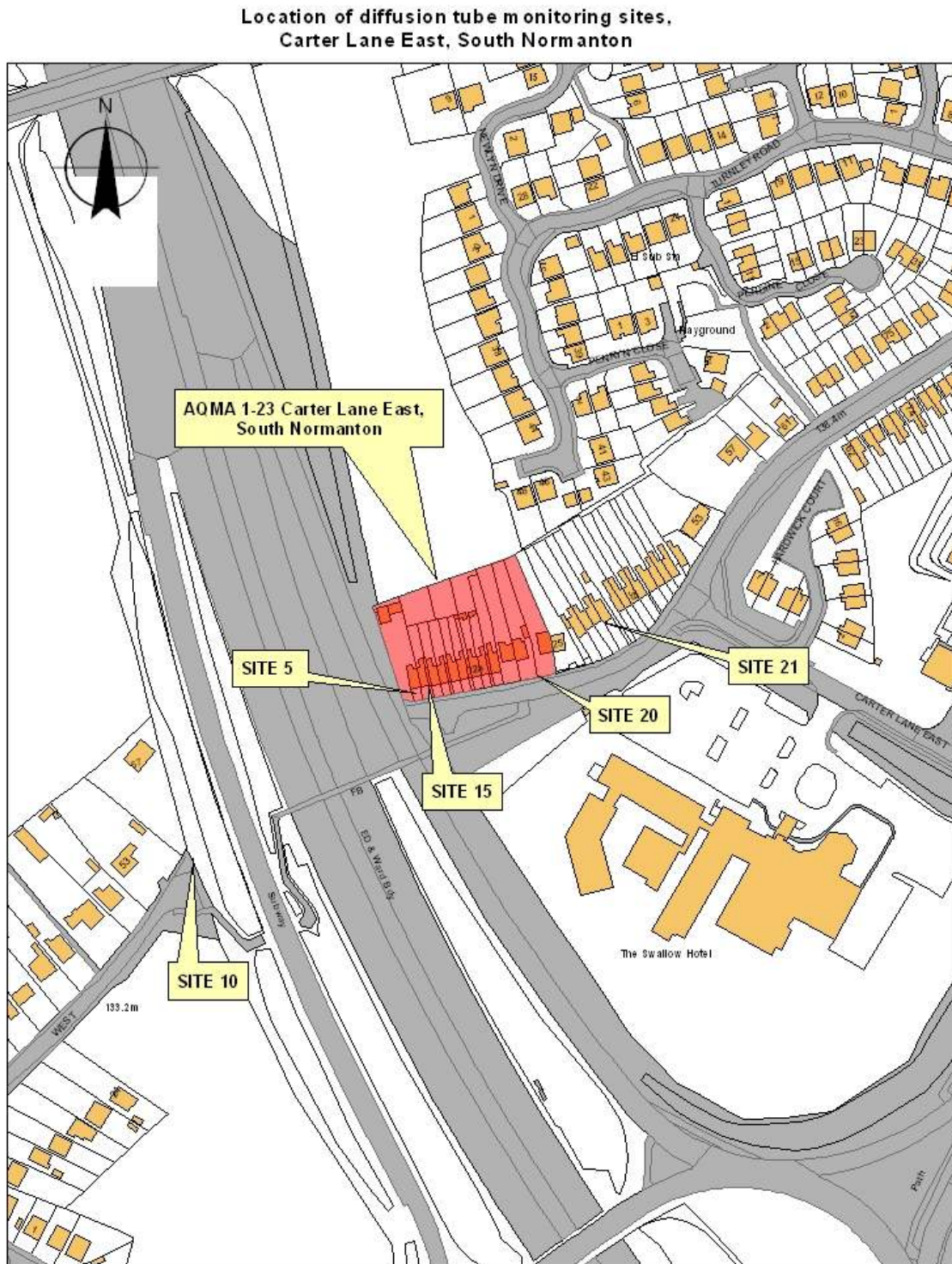


Figure 2.3 Location of diffusion tube monitoring sites at Carter Lane East and Carter Lane West, South Normanton.



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TABLE 2.2 Monthly Mean Nitrogen Dioxide Results 2011

Site ID	NO <sub>2</sub> Monthly Mean Nitrogen Dioxide Results 2011												Annual mean $\mu\text{g}/\text{m}^3$ (unadjusted)	Bias adjusted annual mean $\mu\text{g}/\text{m}^3$ (bias adjustment factor 0.93 )
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
5	51.51	42.12	46.26	46.43	33.33	40.24	44.15	42.84	38.95	45.67	46.3	42.14	43.6*	40.54*
15	46.06	40.65	45.51	44.15	35.79	45.58	42.96	47.51	39.93	48.12	49.76	45.32	44	41
20	47.87	49.25	46.58	47.59	N	36.76	43	46.89	39.12	46.57	48.18	39.18	45	42
21	42.16	41.1	39.87	30.43	28.01	30.83	28.87	35.59	25.44	41.17	40.8	19.06	34	31
10	N	43.91	38.97	34.55	21.89	21.01	25.7	19.47	19.71	36.83	51.58	19.53	30	28

\* mean of triplicate tubes

TABLE 2.3 Annual Mean Nitrogen Dioxide Results 2000 - 2011

Site ID	Annual Mean NO <sub>2</sub> Concentration µg/m <sup>3</sup> (bias adjusted)											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
5	59	58	58	56	49	52	51	43	49	45.5*	* 44 <sup>a</sup> 55 <sup>b</sup> 51 <sup>c</sup>	40.54*
15	-	-	-	-	41	46	51	40	46	45	42 <sup>a</sup> 53 <sup>b</sup> 49 <sup>c</sup>	41
20	48	47	47	44	45	46	50	39	51	41	40 <sup>a</sup> 50 <sup>b</sup> 47 <sup>c</sup>	42
21	37	41	36	37	39	38	36	33	35	36	35	31
Bias adjustment factor	0.85	0.87	0.9	0.9	0.82	0.96	1.01	0.84	0.99	0.91	a 0.99 b 1.25 c 1.16	0.93

\*mean of triplicate tubes NB site 5 was re-located to analyser at 1 Carter Lane East in November 2008

a bias adjustment factor derived from national factors (see Appendix A) 0.99

b bias adjustment factor derived from co-location study of BDC diffusion tubes on ARUP continuous analyser at 1 Carter Lane East 1.25 (calculated using 10 periods of data)

c bias adjustment factor derived from co-location study of ARUP diffusion tubes on ARUP continuous analyser at 1 Carter Lane East 1.16 (calculated using 12 periods of data)

## 2.2 Conclusions

The main progress indicator for monitoring the effectiveness of the Action Plan is the monitoring of NO<sub>2</sub> levels to determine if air quality is improving. Unfortunately due to the cessation of automatic monitoring and diffusion tube monitoring undertaken by the Highways Agency the only monitoring now undertaken is the Council's diffusion tube monitoring.

The 2011 Air Quality Progress Report for Bolsover District Council contained results of the automatic monitoring undertaken by ARUP on Carter Lane East which for 2010 recorded an annual mean of 54.9µg/m<sup>3</sup> (93% data capture) compared to 44.6µg/m<sup>3</sup> (72% data capture) in 2009.

The report also stated that the Highways Agency had been asked to provide comments on the increased levels experienced in 2010 and if there were any proposals in terms of addressing the exceedence of the national air quality objective. A response was awaited at the time of writing the report. A response was received from the Highways Agency in December 2011. Their response stated that the only observations they were able to make was that in 2009 the M1 on this section was subject to a 50 mph speed limit while widening took place between Junctions 25-28. For most of 2010 the motorway returned to the national speed limit which they would expect to result in significantly higher emissions. Due to the presence of speed cameras the lower speed limit in 2009 was widely complied with. The traffic flows between Junction 28-29 increased by just 1% from 2009 to 2010 which in their view would be unlikely to have made a significant contribution to the NO<sub>2</sub>.

With regard to any proposals for addressing the exceedence, the Agency's comment stated that at present they have no works proposals specifically aimed at reducing emissions on this strategic route.

It is now widely recognised that NO<sub>2</sub> levels were elevated nationally during 2010 so the elevated levels experienced within the AQMA in 2010 may be due to a combination of local and regional factors. In 2011 the levels decreased compared to 2010 although it must be noted that in the absence of an automatic monitor the assessment of pollutant concentrations is based purely on the results of diffusion tube monitoring. The air quality objective is only marginally exceeded in 2011 indicating an improvement in ambient levels of NO<sub>2</sub>. This decrease in NO<sub>2</sub> levels was also experienced at the Council's other monitoring sites which are located throughout the district. The Council will continue to monitor in order to assess levels against the air quality objective.

The Environmental Scoping Report for the Managed Motorway scheme between Junction 28 and Junction 31 of the M1 was issued to consultees in April 2012. The report outlines the approach, methodology and environmental topics that will be included within the environmental assessment and reported in the Environmental Assessment Report (EAR). The environmental assessment will determine if the proposals will likely result in significant environmental affects and therefore require the publication of an Environmental Statement (ES).



### **3 References**

Air Quality (England) Regulations 2000 (SI 928).

Air Quality (England) (Amendment) Regulations 2002 (SI 3043)

Environment Act 1995

Local Air Quality Management Technical Guidance LAQM.TG(09)

Local Air Quality Management Policy Guidance LAQM.PG(03)

Air Quality Action Plan for the District of Bolsover Air Quality Management Area  
August 2004.

Bolsover District Council – Stage 3 Local Air Quality Review and Assessment,  
December 2000.

Bolsover District Council – Progress Report 2011

Highways Agency -M1 Junction 28 to 31 Managed Motorways Environmental  
Scoping Report – Mouchel Group April 2012

# Appendices

## Appendix A: QA:QC Data

### Diffusion Tube Bias Adjustment Factors

National bias adjustment factors are obtained from the local air quality management section of the defra website at:

<http://www.defra.gov.uk/environment/quality/air/airquality/local/support/>

The relevant bias adjustment factor used for correcting the annual mean diffusion tube results for 2010 is 0.99 (obtained from spreadsheet version 04/11). For 2011 the bias adjustment factor is 0.93 (obtained from spreadsheet version 03/12).

### Discussion of Choice of Factor to Use

In 2010 a co-location study was undertaken at 1 Carter Lane East, South Normanton within the AQMA. The automatic analyser was operated by ARUP on behalf of the Highways Agency. The bias adjustment factor obtained from the BDC co-location study was 1.25 and for the ARUP study was 1.16. These local bias adjustment factors have been applied to the 2010 results of the diffusion tube sites which are located within the AQMA. The co-location study is located within 13m of the M1 slip road and can be considered a roadside site. The slip road also experiences periods of queuing traffic. The location is not considered to be representative of the monitoring sites outside the AQMA and therefore it is considered more appropriate to apply the national bias adjustment factors to other sites.

### QA/QC of diffusion tube data

Prior to 2010 diffusion tubes were prepared and analysed by South Yorkshire Laboratory (SYL) using the preparation method 50% Triethanolamine (TEA) in acetone. The laboratory took part in the proficiency testing scheme managed by the Health & Safety Laboratory, the WASP scheme. For 2008 and 2009 the performance for SYL was good.

Due to closure of SYL at the end of 2009 the supplier of diffusion tubes changed to Gradko International Ltd. The preparation method chosen was 50% Triethanolamine (TEA) in acetone in order to be consistent with the method used by the previous laboratory SYL. The performance for Gradko for April 2009 – April 2010 was good.

Under the new scoring scheme (<http://laqm.defra.gov.uk/diffusion-tubes/ga-qc-framework.html>) Gradko achieved 100% satisfactory results in 3 out of 4 of the quarterly tests for both 2010 and 2011.

A summary of precision results for individual laboratories is available at <http://laqm.defra.gov.uk/diffusion-tubes/precision.html>. The results for Gradko are generally good.