



# 2010 Air Quality Progress Report for *Rushcliffe Borough Council*

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

Date April 2010

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## Executive Summary

This report provides an update with respect to air quality issues within the borough of Rushcliffe over the year 2009 and the progress of implementation of the measures outlined in the Air Quality Action Plan (AQAP), published initially in May 2007 (updated 2009) as required by the Environment Act 1995. Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work.

The AQAP contains a set of measures aimed at working toward ensuring the air quality in Rushcliffe meets the Air Quality Objectives set out in the National Air Quality Strategy due to excessive levels of Nitrogen Dioxide in air quality management areas (AQMA's) within the Borough.

Rushcliffe has two air quality management areas both of which have been declared due to traffic pollution and in particular due to excessive levels of Nitrogen Dioxide above the air quality objective (AQO) level in certain areas. The areas covered by the AQMA's are the Trent Bridge/Radcliffe Road/Wilford lane areas and part of the A52 ring road up to the Nottingham Knight traffic island. Both of these areas are major traffic routes into/out of and around the Nottingham area and are controlled by partner organisations to Rushcliffe; namely, the Highways Agency and Nottinghamshire County Council.

This report includes consideration of new monitoring data and emissions sources assessed by Rushcliffe Borough Council over the 2009 period.

Rushcliffe has undertaken atmospheric pollution monitoring of particulate matter (PM<sub>10</sub>), NO<sub>2</sub>/NO<sub>x</sub> (chemi-luminescent monitor) and NO<sub>2</sub> diffusion tube monitoring at 40 locations in 2009. The progress report assessment review of new monitoring data has shown that exceedences of Nitrogen Dioxide annual mean objective continue to occur within Rushcliffe's Air Quality Management Area 1 at certain locations that are relevant locations close to busy roads. In AQMA 2, all sites have been shown to be below the AQO, although at this time, it is recommended to monitor further before considering revoking the AQMA. The PM<sub>10</sub> levels have been shown to be in compliance with the AQO.

The progress report concludes that no Detailed Assessment is required for benzene, 1, 3-butadiene, carbon monoxide, lead, particulates (PM<sub>10</sub>), and sulphur dioxide.

Outside of the Air Quality Management Areas, there is one exceedences of the Nitrogen Dioxide annual mean objective at Holme House at the junction of the A52 and the Stragglethorpe Road, Radcliffe on Trent. Rushcliffe have commenced a Detailed Assessment (DA), which includes at this stage additional monitoring at the site, and will report the conclusions of the DA at the next R&A report stage or as soon as practicable if earlier. It is not proposed to undertake real time monitoring of NO<sub>2</sub> at this site but rather to model the junction based on robust diffusion tube data. Rushcliffe have no data for PM<sub>10</sub> at this junction as such is proposing to move the

PM10 monitor to this junction from its current site with the assistance of the Highways Agency.

A number of diffusion tube monitoring sites have been altered in 2009 as recommended in the previous USA 2009. These new sites will better reflect relevant exposure and make the assessment for the R&A process easier and clearer in future. This report has highlighted that the Heather vale site can also be repositioned to represent worse case exposure.

The new monitoring data has not identified any exceedences of the hourly NO2 objective.

The AQAP through the LTP has been successful in implementing a number of measures with the aim of reducing car usage and reducing the impact of road vehicles in and around the AQMA areas. The LTP targets are all rated as moving in the right direction or showing no particular trend with the exception of LTP3 - Cycling trip (annualised index), which is reported as 'going in the wrong direction'.

A comprehensive list of interventions undertaken to date and progress since the last R&A report by the Nottinghamshire County Council through The Local Transport Plan is shown in, Chapter 9.

Progress has been made on introducing the work place parking levy enabling the go ahead for the NET2 tram system, which has the potential to reduce traffic congestion and pollution into and out of the city when operational in a number of years time. Unfortunately, the Gamston park and ride site has been postponed by the County Council due to finance issues but alternatives are being examined by them. This measure, with a combination of low emission buses, has the potential to reduce commuter traffic through AQMA 1 in particular.

Rushcliffe BC continues to work toward reducing its own impact on the air quality by introducing a number of measures such as remote working, good fleet management, energy efficiency measures, green procurement strategy and working toward the introduction of a travel plan for employees. Currently work is being undertaken in the 'fit for purpose' review that will look at how all aspects of the council operate and will influence the development and implementation of these measures.

Only limited development has taken place in 2009 in Rushcliffe however, the Sharphill development has been approved at planning appeal. This will see 1200 houses and other associated developments take place in Rushcliffe over a number of years. Air quality was fully considered in this application with initial objections being raised by the Environment & Waste Management Service (E&WMS) until further information was forthcoming. Reserved matters include details of mitigation for air quality and climate change targets.

The A46 dualling is currently being constructed and is at ground works stage. Again, the construction and operation of this road was fully considered at the consultation stage and through the public enquiry.

The LDF process over 2009 has been identifying where further development should be placed in the borough as required by Government and has just finished part of the



consultation process (in early 2010). Sites in Gamston and south of Clifton adjacent to the A453 have been identified as large-scale development areas.

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# 1 Introduction

## 1.1 Description of Local Authority Area

The Borough of Rushcliffe covers 157 square miles (around 400 sq km) and has a population of 106,051 (2002). It stretches from the River Trent to the Leicestershire borders and eastwards along the Trent Valley, to within a few miles of Newark.

The largest town is West Bridgford, with a population of about 36,000. This is part of the Greater Nottingham conurbation, being separated from the City of Nottingham by the River Trent. The other major settlements within the Borough are Bingham, Cotgrave, East Leake, Keyworth, Ruddington and Radcliffe-on-Trent.

Several major roads cross the Borough, linking the Borough with both the M1 and the A1. There are also high daily traffic flows in West Bridgford, from the major arterial routes into the Nottingham city centre. Although the Borough is predominantly rural in nature, it also contains some significant industrial processes. These include Ratcliffe-on-Soar power station and the British Gypsum plasterboard factory at East Leake.

Nottingham East Midlands Airport (NEMA) lies immediately to the south west of Rushcliffe, within the district of North West Leicestershire District Council. Although the flight paths for both approaching and departing aircraft pass directly over the Borough, the air quality impacts of the airport itself do not affect Rushcliffe residents.

## 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 microgram's per cubic metre  $\mu\text{g}/\text{m}^3$  (for carbon monoxide the units used are milligram's per cubic metre,  $\text{mg}/\text{m}^3$ ). 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
<b>Benzene</b>	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
<b>1,3-Butadiene</b>	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
<b>Carbon monoxide</b>	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
<b>Lead</b>	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
<b>Nitrogen dioxide</b>	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
<b>Particles (PM<sub>10</sub>) (gravimetric)</b>	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
<b>Sulphur dioxide</b>	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

## 1.4 Summary of Previous Review and Assessments

In 2000, Rushcliffe Borough Council reported the findings of its original review and assessment of local air quality. This was a 3-stage process, concluding that with the exception of particulates, there was no need to proceed beyond Stages 1 and 2.

A more detailed Stage 3 assessment was carried out for particulate matter (PM10), due to both potential inaccuracies in the atmospheric dispersion modelling and the predicted concentrations being close to the objective. Monitoring data was used to validate the computer modelling. It determined that the objective would be unlikely to be exceeded. It was therefore concluded that there was no need to declare an AQMA.

The first phase of the second round of review and assessment (the USA), was completed in 2003 and this provided an update with respect to air quality issues within Rushcliffe. The USA concluded that the annual mean NO<sub>2</sub> objective might not be met at Wilford Lane, Trent Bridge, Lady Bay and A52/Botany Close and it was required to undertake a detailed assessment. The 24-hour, 1-hour and 15-minute mean objectives for SO<sub>2</sub> were predicted to be exceeded in the vicinity of the coal-fired kiln at the Lafarge UK Ltd. cement plant at Barnstone and it was required to undertake a Detailed Assessment.

The Detailed Assessment undertaken in 2005 concluded that the annual mean objective for NO<sub>2</sub> would be exceeded. As a result, two AQMA's were declared on 1st September 2005. AQMA1 included the areas around Wilford Lane, Trent Bridge and Lady Bay (see Map 1.1 Map 1.). AQMA2 included the area around A52/Botany Close (Map 1.1). The AQS objectives were also found to have been exceeded in respect of SO<sub>2</sub> in the vicinity of Lafarge UK Ltd. cement plant at Barnstone and as a result, AQMA 3 was declared on 1st September 2005.

The 2006 USA determined that there were no exceedences of the AQS objectives identified within their local authority area outside the AQMA's and therefore a Detailed Assessment was not required.

Due to the closure of the Lafarge UK Ltd. cement plant at Barnstone, SO<sub>2</sub> concentrations reduced in the local vicinity of AQMA 3 to below their AQS objectives. AQMA 3 was subsequently revoked on 27th April 2007

In 2008, the progress report concluded that NO<sub>2</sub> had not improved in 2007 with some sites experiencing higher than previous years results including outside of AQMA's. The results indicated that NO<sub>2</sub> at certain receptor locations continued to exceed the NO<sub>2</sub> AQS objectives and that the AQMA's should remain in place. NO<sub>2</sub> in general increased over 2007 rather than decreased and the report predicted that it would be unlikely that the predicted reductions in NO<sub>2</sub> will see an improvement in NO<sub>2</sub> levels such that, all sites will be below the objective level by 2010 as predicted in the USA.

The diffusion tube site on the A46 (East Bridgford site) indicated that 2007 levels were above the objective levels at the façade to a domestic dwelling close to the road. However, the major road improvements to be undertaken and the relocation of the trunk road in the near future were expected to see an improvement in NO<sub>2</sub> exposure at this site.

The 2008 report concluded that there were no plans to declare a further AQMA at this site or to extend the AQMA's already declared but sites close to exceeding or outside of the AQMA's would be increased in tube numbers and each monitoring position reviewed to determine compliance with published guidelines. This led to a general review of existing monitoring sites with some changes over 2008. The response from Defra indicated despite the imminent road building at the East Bridgford site, that the site should be closely monitored and proceed to a DA if necessary. The data acquired so far could be used as the preliminary for a DA.

In 2009 a separate USA and AQAP progress reports were produced. The USA being undertaken by consultants Bureau Veritas. The USA 2009 concluded that over 2008 the sites identified in the previous round had fallen below the objectives and there was no need to undertake detailed assessments at these sites. The A46 bypass at East Bridgford had also begun construction.

In addition, generally in 2008, NO<sub>2</sub> had fallen compared to the previous year's results and the report concluded that there was no requirement to undertake a detailed assessment in the area. The report concluded that some existing diffusion tube sites were not at relevant receptor sites and should be relocated to better represent exposure to the public. This recommendation was undertaken for the start of the 2009 year.

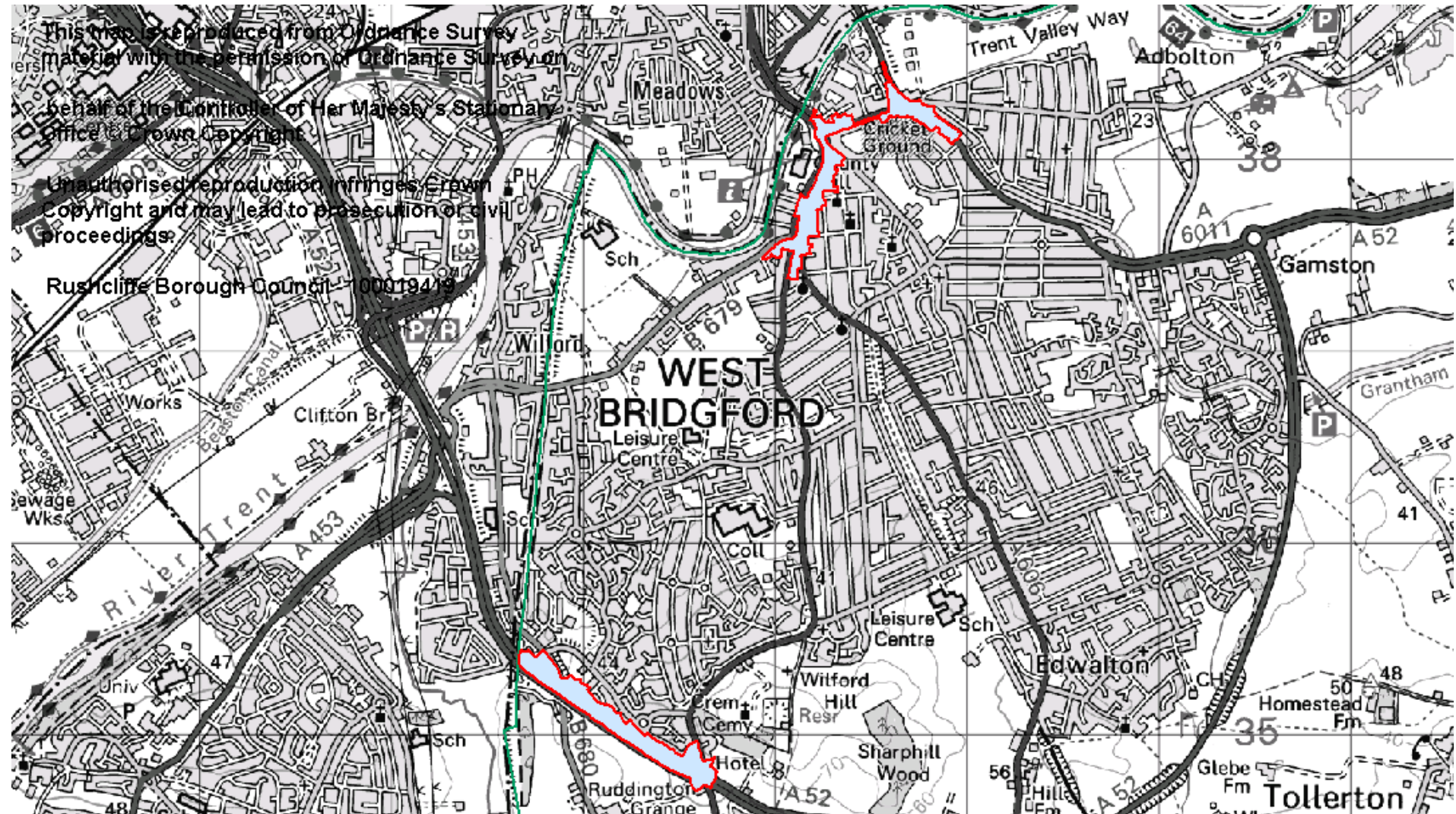
During 2009, additional sampling using diffusion tubes was undertaken at Holme House on the A52 at the Junction of Stragglethorpe Road (see Map 1.4) as a result of this site being identified via an air quality assessment through the planning process as potentially high, but according to the assessment, still below the AQS objective. Results from diffusion tube monitoring on a lamppost have indicated exceedences. Consequently contact was made with the R&A Help Desk and it was determined to increase the sampling strategy at the site and to sample at the façade. Ongoing results in 2009 have shown high levels above the AQS objectives at the façade and the decision was made in 2009 to undertake a detailed assessment at this receptor location.



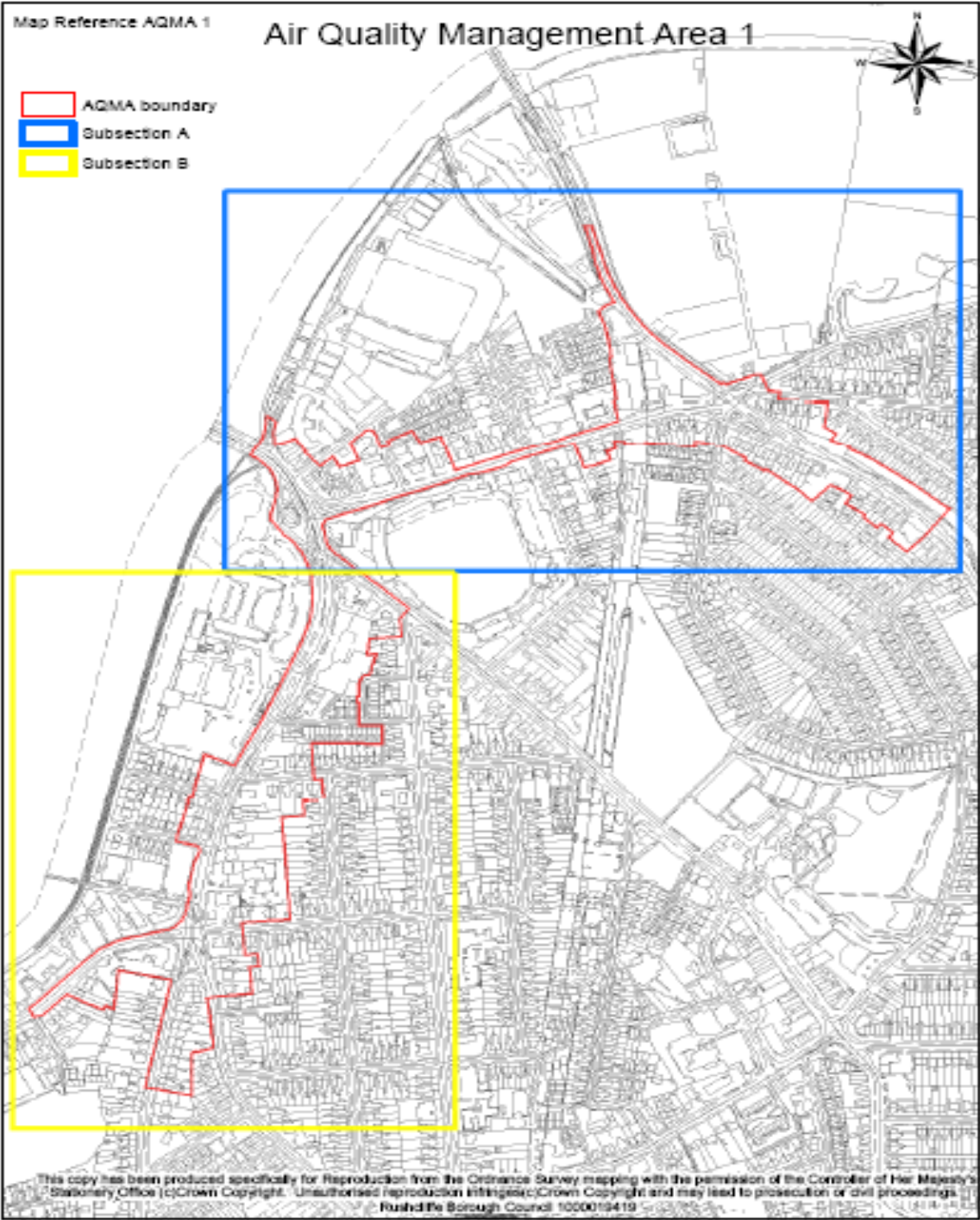
**Table 1.2 showing previous review and assessment reports**

Report title	Date Produced
Air Quality Action Plan 2009 Progress Report	July 2009
Updating and Screening Assessment Review and Assessment of Local Air Quality (2009)	July 2009
Air Quality Progress Report 2008	June 2008
Air Quality Review: Assessment Progress Report June 2007	June 2007
Air Quality Action Plan: May 2007	May 2007
Air Quality Management No 3 Order Revocation order (2007)	April 2007
Updating and Screening Assessment, Review and Assessment of Local Air Quality 2006	April 2006
Progress report 2005	April 2005
Detailed assessment of Sulphur dioxide and nitrogen dioxide	February 2005
Updating and Screening Assessment Review and Assessment of Local Air Quality (May 2003)	May 2003
Annual Report on Air Quality (2002)	2002
Air Quality Review and Assessment (2000)	December 2000

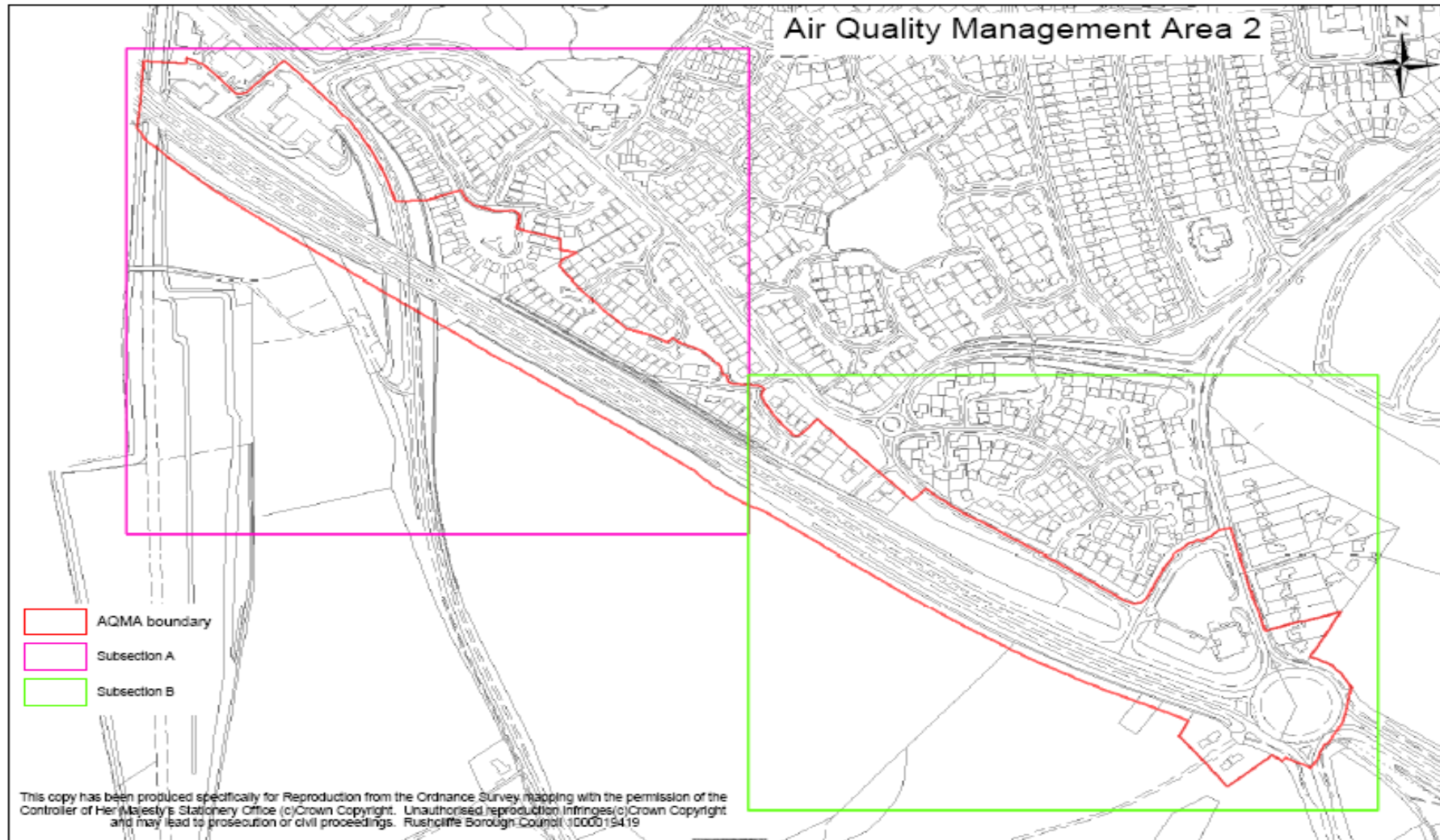
Map 1.1 Map of AQMA 1 & AQMA 2 boundaries



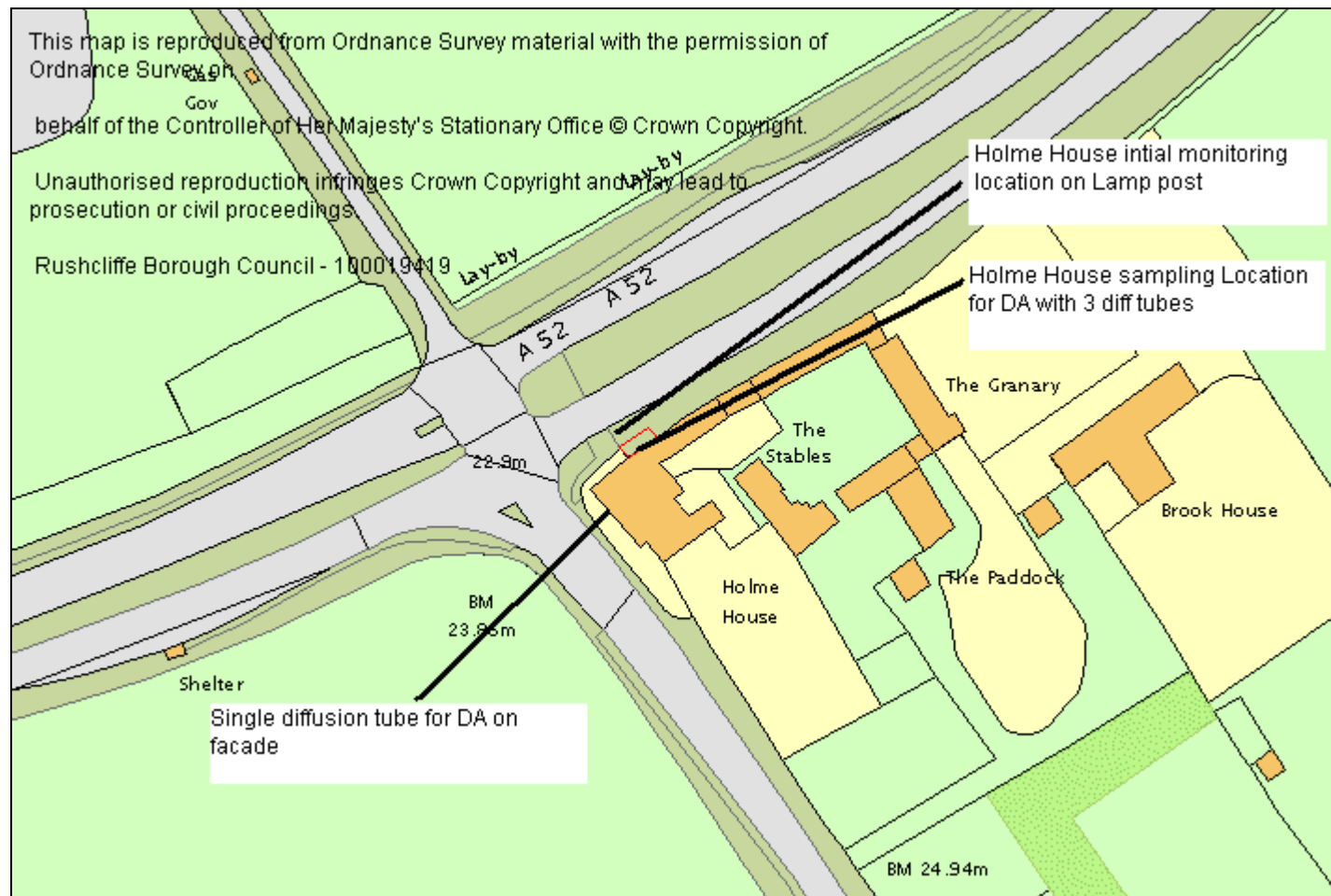
Map 1.2 Detailed Map of AQMA 1 Boundaries



Map 1.3 Detailed Map of AQMA 2 Boundaries



Map 1.4 Map of Holme House A52/Stragglethorpe Road, Radcliffe on Trent



## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

#### **2.1.1 Automatic Monitoring Sites**

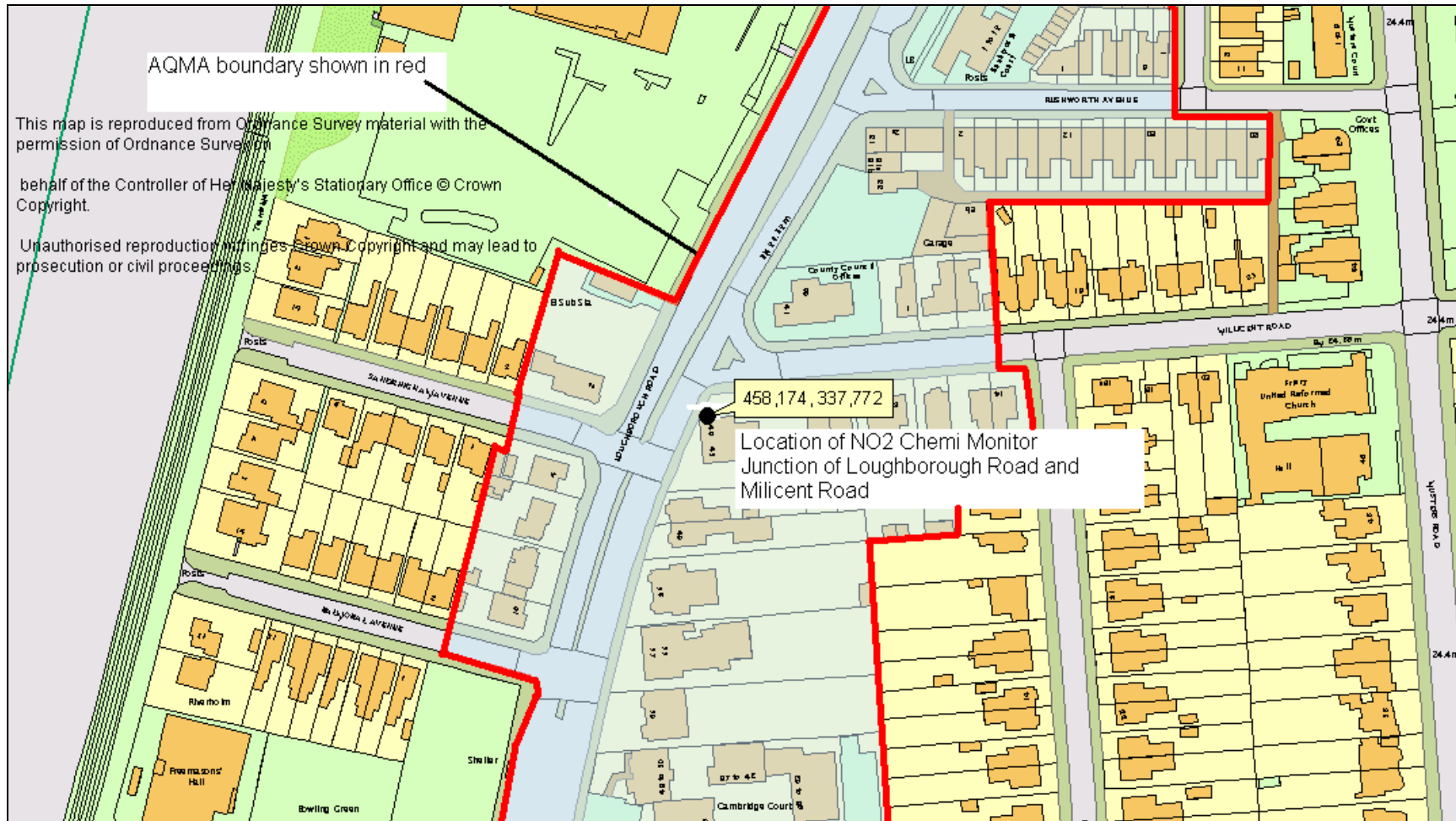
Rushcliffe undertakes automatic monitoring for PM10 and NO<sub>2</sub>/NO<sub>x</sub> at two locations within the AQMA 1.

No new automatic monitoring sites have been started up since the last round of the review and assessment process. The locations of the 2 operational monitors in the district are shown in Map 2.1 Location of Automatic Monitoring Sites (NO<sub>2</sub> monitor) and Map 2.2 Location of Automatic Monitoring Sites (PM10 Monitor) shown below.

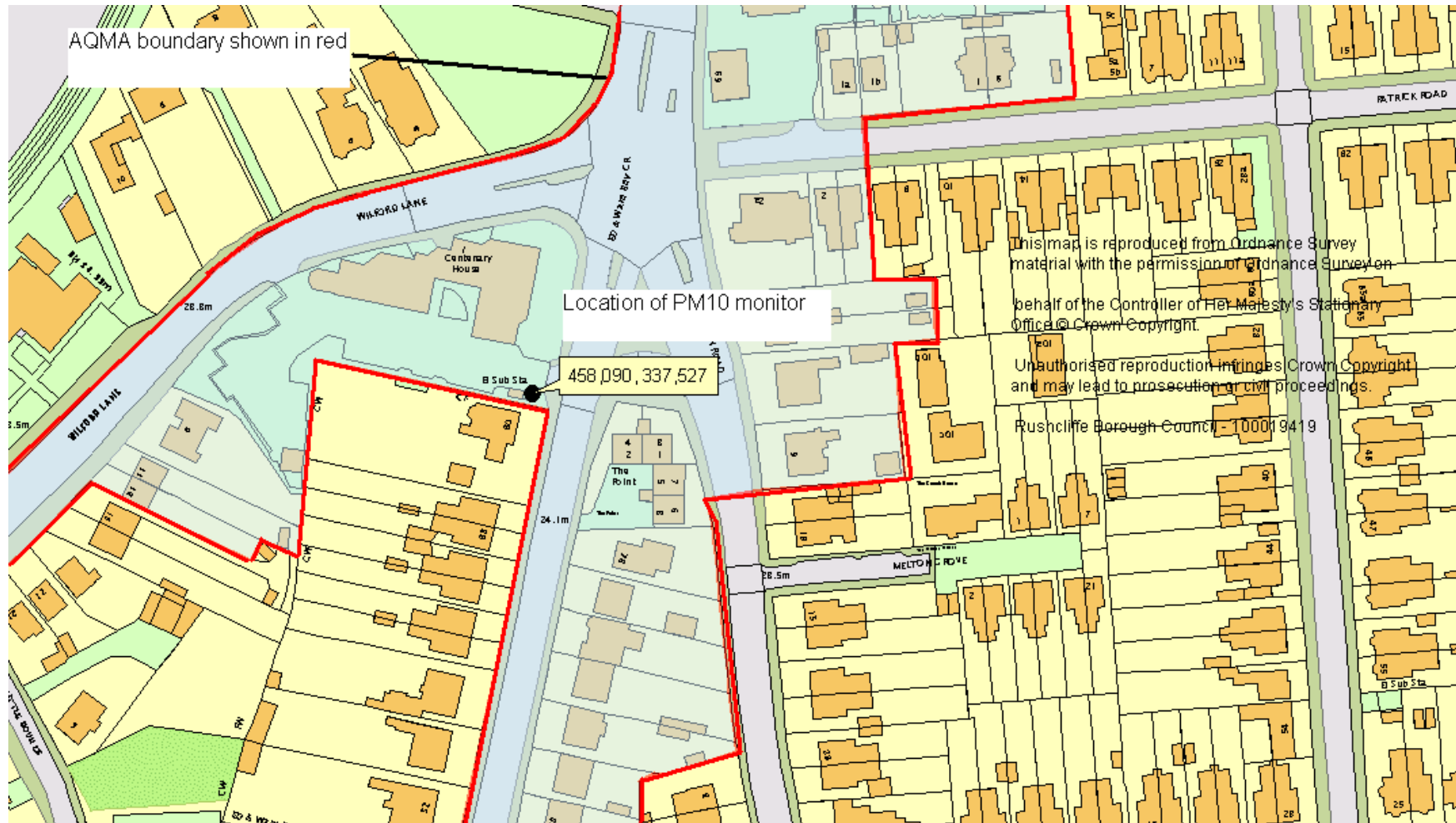
The monitoring at both sites has been undertaken over the full year covered by this report.

Table 2.1 below confirms the grid references for the monitor locations in the borough.

Map 2.1 Location of Automatic Monitoring Sites (NO2 monitor)



Map 2.2 Location of Automatic Monitoring Sites (PM10 Monitor)





**Table 2.1 Details of Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQM A?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Centenary House, Loughborough Road, West Bridgford	Road Side	458090	337527	PM <sub>10</sub>	Gravimetric	Y	Y (6m)	7.3m	Y
Loughborough Road/Milicent Road, West Bridgford	Road Side	458174	337772	NO <sub>2</sub>	Chemi-luminescence	Y	Y(0m)	5.0m	Y

### 2.1.2 Non-Automatic Monitoring

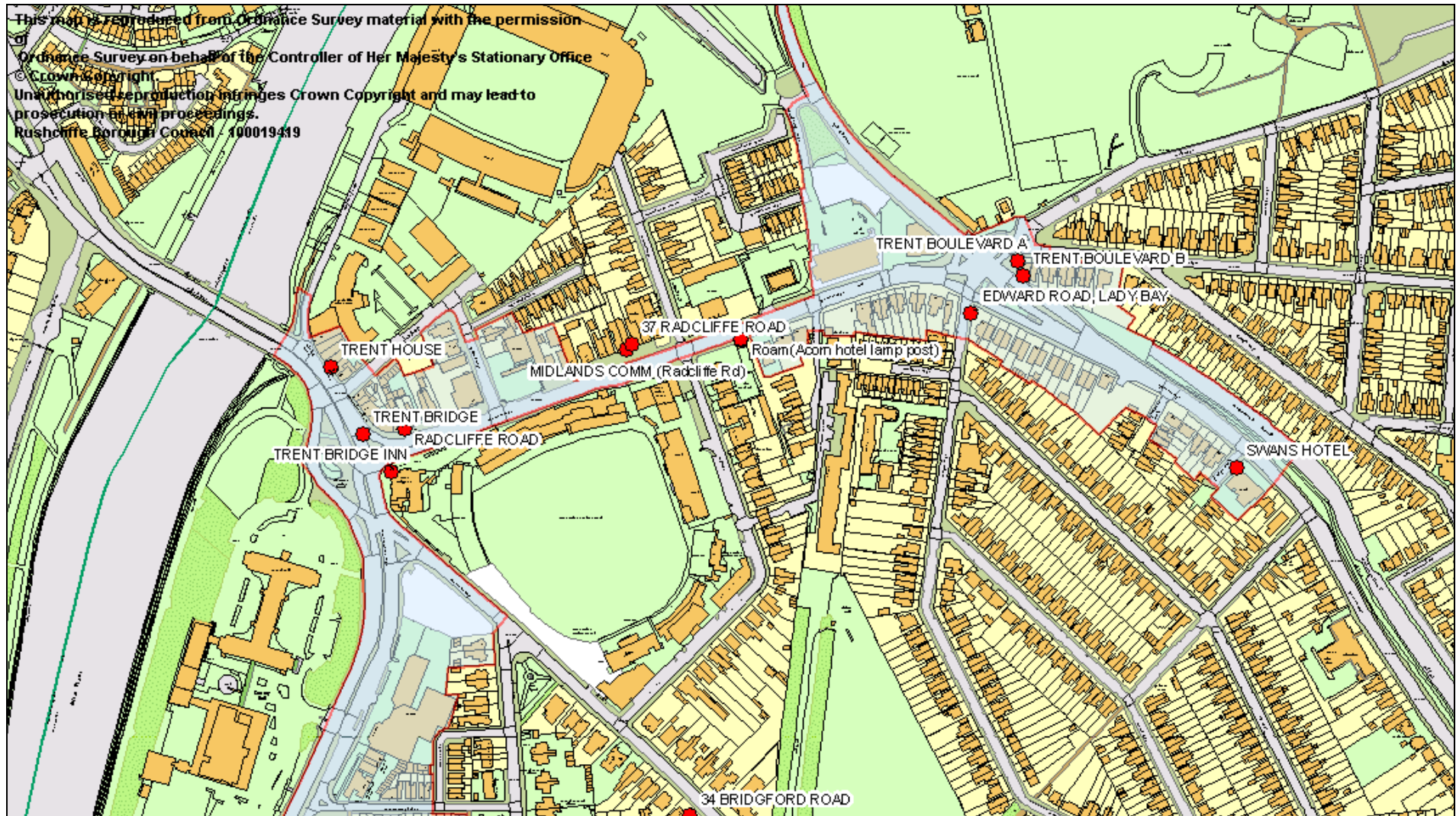
Rushcliffe Borough Council undertook monitoring at 40 NO<sub>2</sub> diffusion tubes sites in 2009, no other non-automatic monitoring took place in the Borough during the year. The diffusion tubes are supplied and analysed by Gradko International Ltd utilising the 20% Triethanolamine (TEA) in water preparation method. Analysis was performed by a UKAS accredited laboratory, Gradko International Laboratory in accordance with a Laboratory Quality Management System with the analysis being carried out with a documented in-house laboratory method GLM7

Gradko have demonstrated satisfactory performance in the WASP scheme for analysis of NO<sub>2</sub> diffusion tubes, October 2008 – October 2009. Results under WASP scheme are rated 'good' performance on the basis of RPI, OLD and NEW CRITERIA, best 4 out of the 5 rounds 103-107.

With regard to the application of a bias adjustment factor for the diffusion tubes, the LAQM.TG (09) and Review and Assessment Helpdesk recommends use of a local bias adjustment factor where available and relevant to diffusion tube sites. Rushcliffe Borough Council operates a triplicate diffusion tube co-location with a continuous NO<sub>2</sub> analyser on Loughborough Road/Millicent Road (AKA 1 Loughborough Rd) in West Bridgford. The data from this co-location has been used to calculate a local bias adjustment factor. This bias adjustment factor has been applied to the relevant period's diffusion tube data. The bias factor calculations are displayed in Appendix A. Where diffusion tube sites are not directly sited on the façade of a relevant receptor a prediction is made using the fall off with distance tool available from <http://www.airquality.co.uk/laqm/tools.php>. The bias adjustment factor applied on diffusion tubes in this report is 0.95.

Site details are contained in Table 2.2 Details of Non- Automatic Monitoring Sites with maps of site locations shown in maps Map 2.3 to Map 2.15

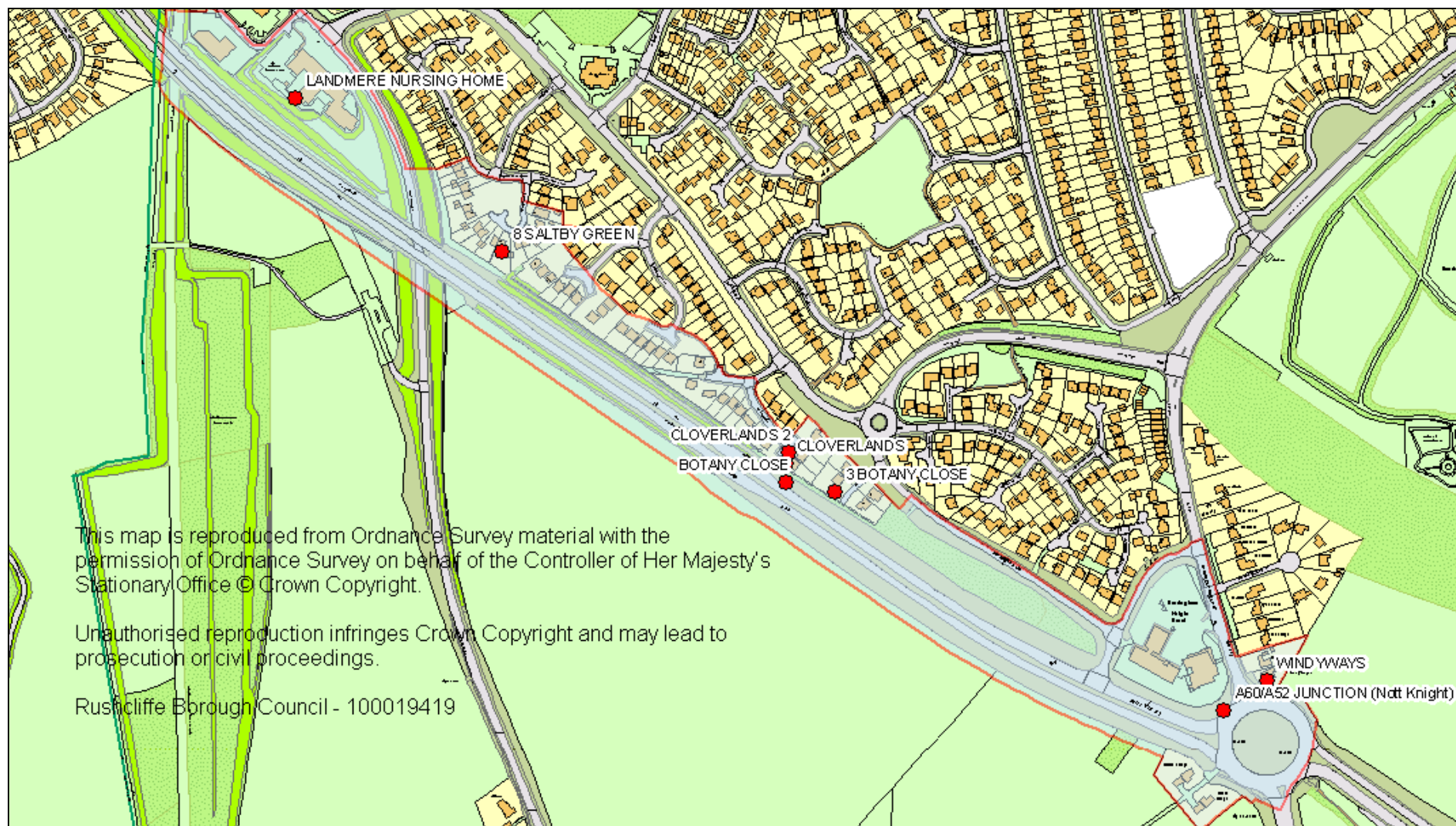
Map 2.3 Locations of Non-Automatic Monitoring Sites



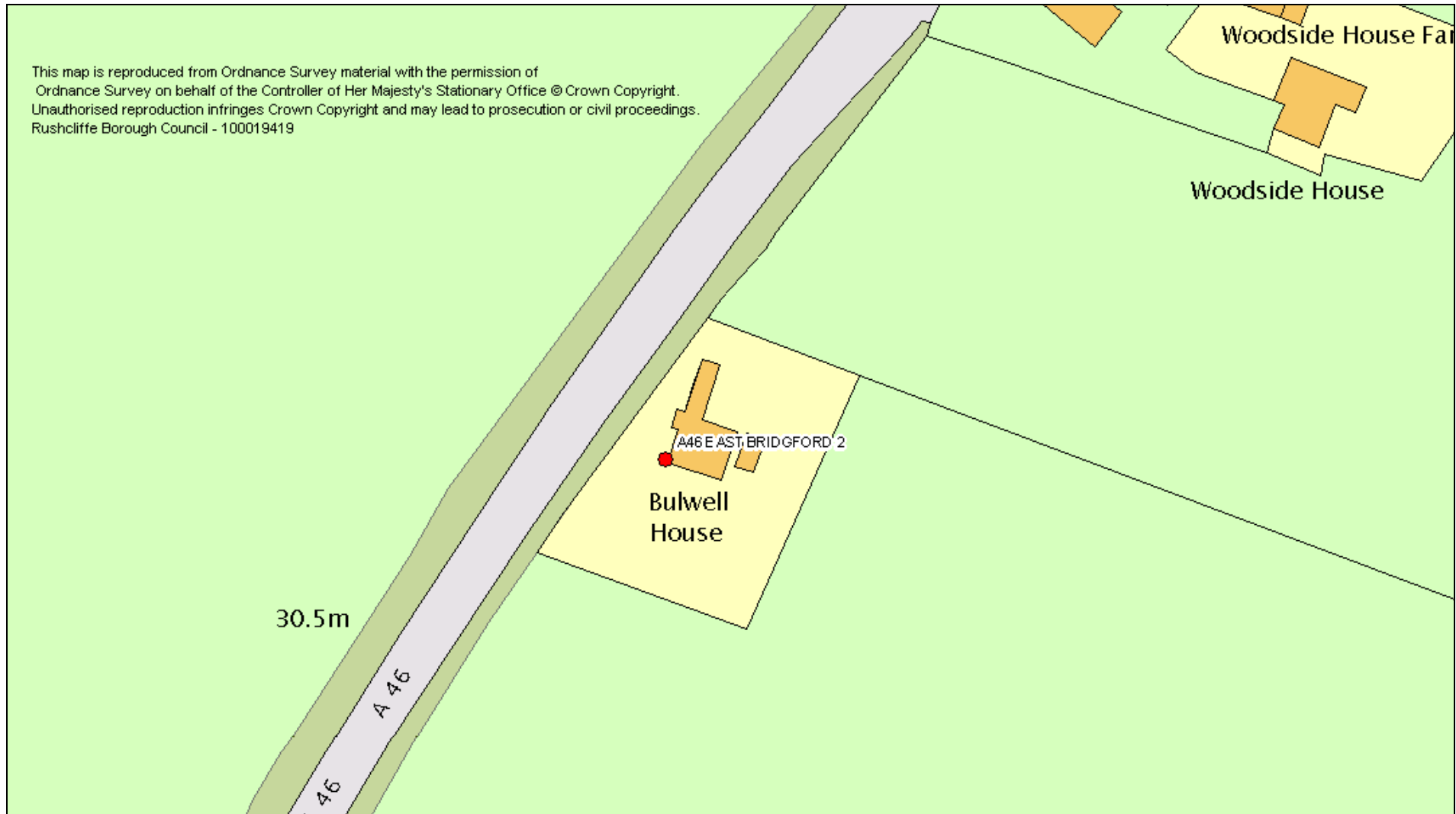
Map 2.4 Locations of Non-Automatic Monitoring Sites



Map 2.5 Locations of Non-Automatic Monitoring Sites



Map 2.6 Locations of Non-Automatic Monitoring Sites



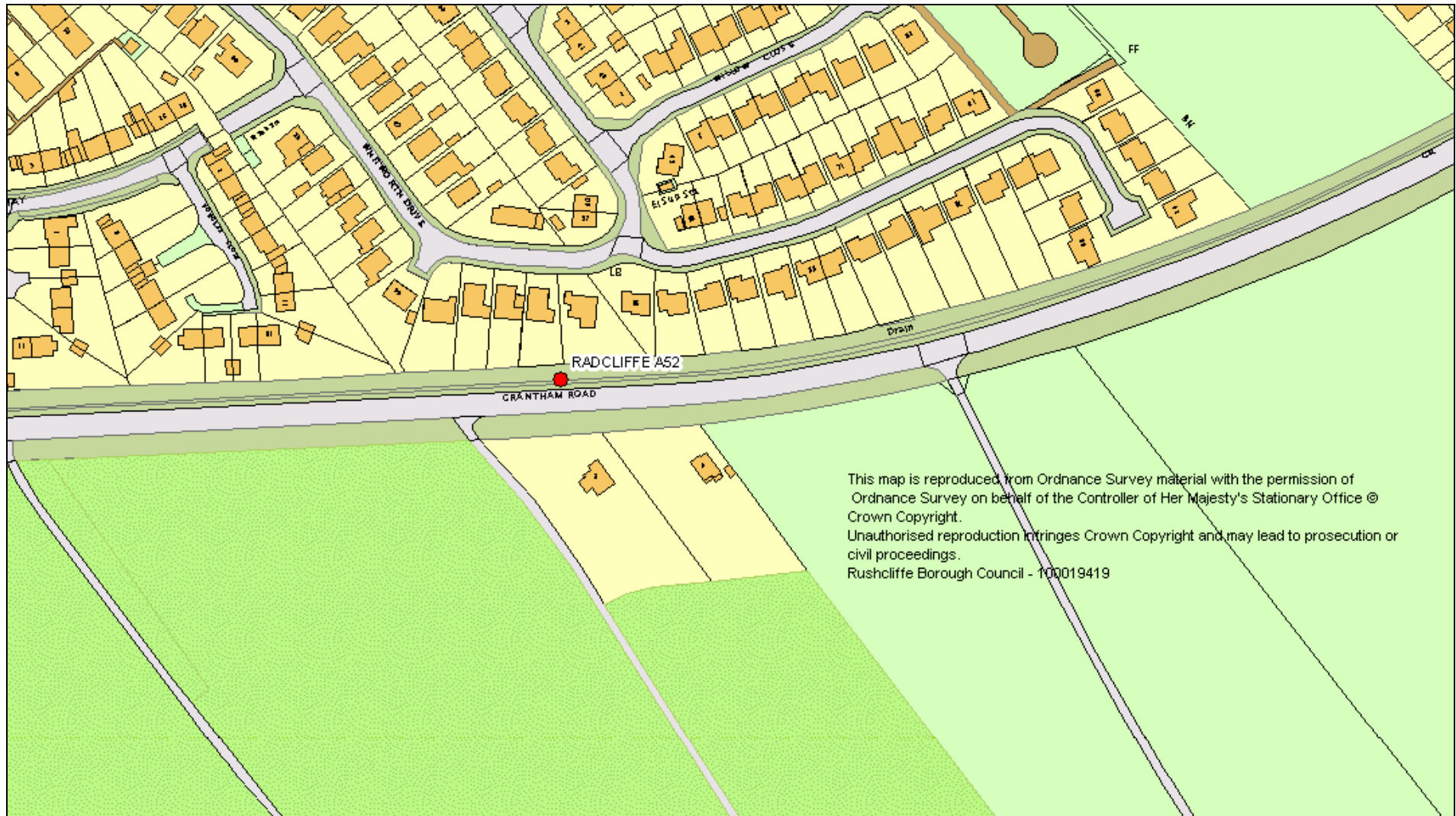
Map 2.7 Locations of Non-Automatic Monitoring Sites



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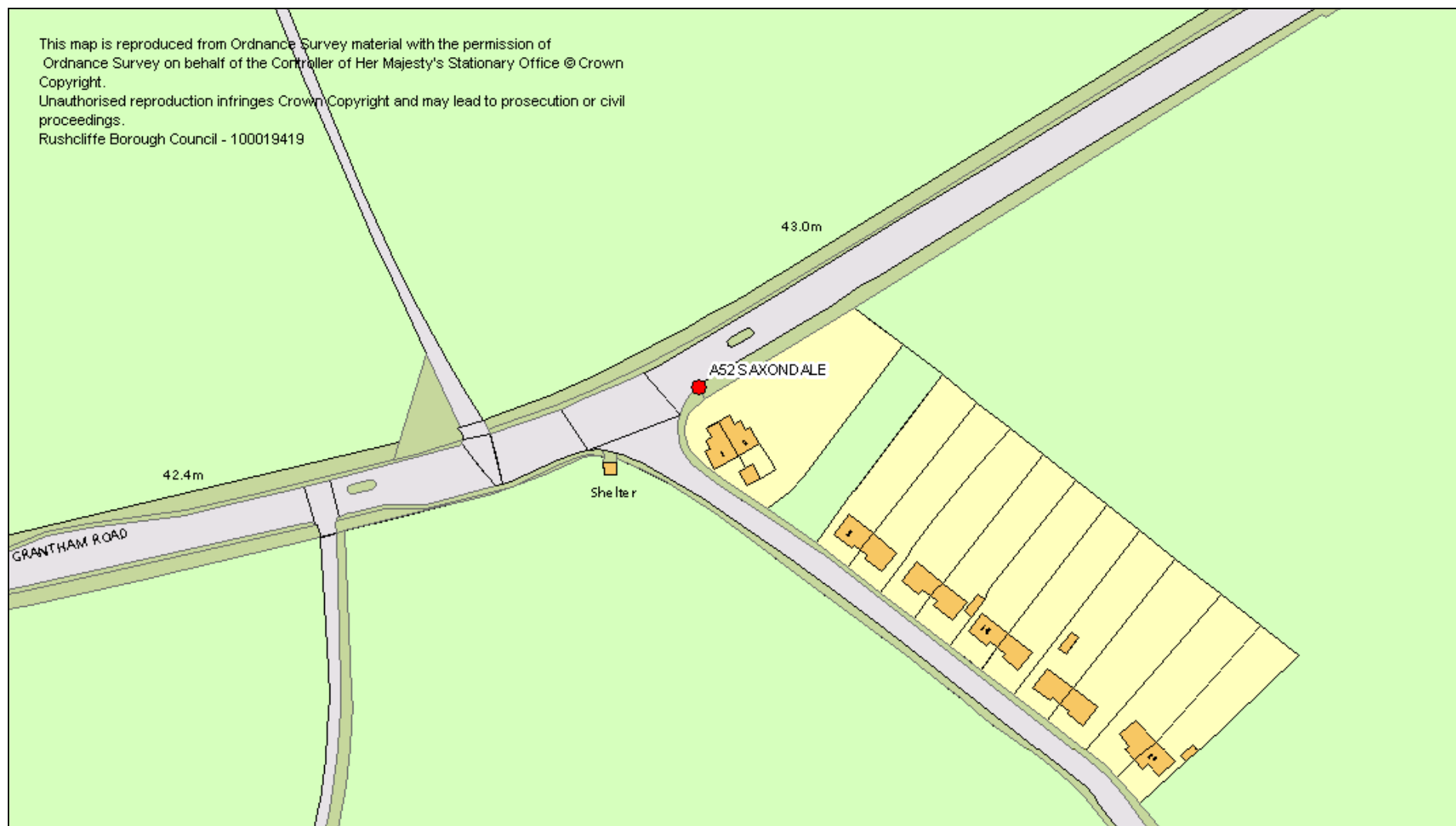
Rushcliffe Borough Council

Map 2.8 Locations of Non-Automatic Monitoring Sites





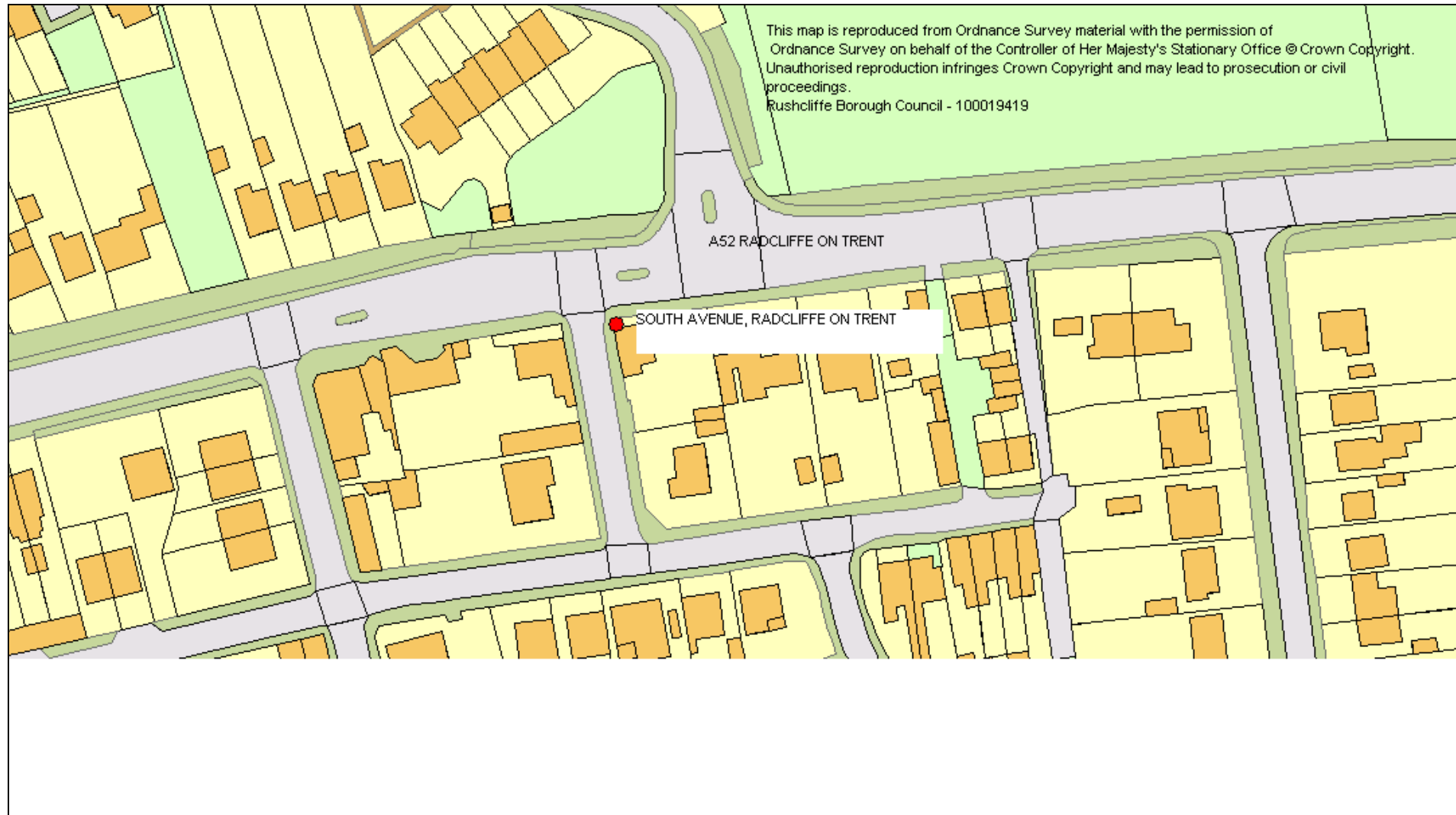
Map 2.9 Locations of Non-Automatic Monitoring Sites



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Rushcliffe Borough Council

Map 2.10 Locations of Non-Automatic Monitoring Sites



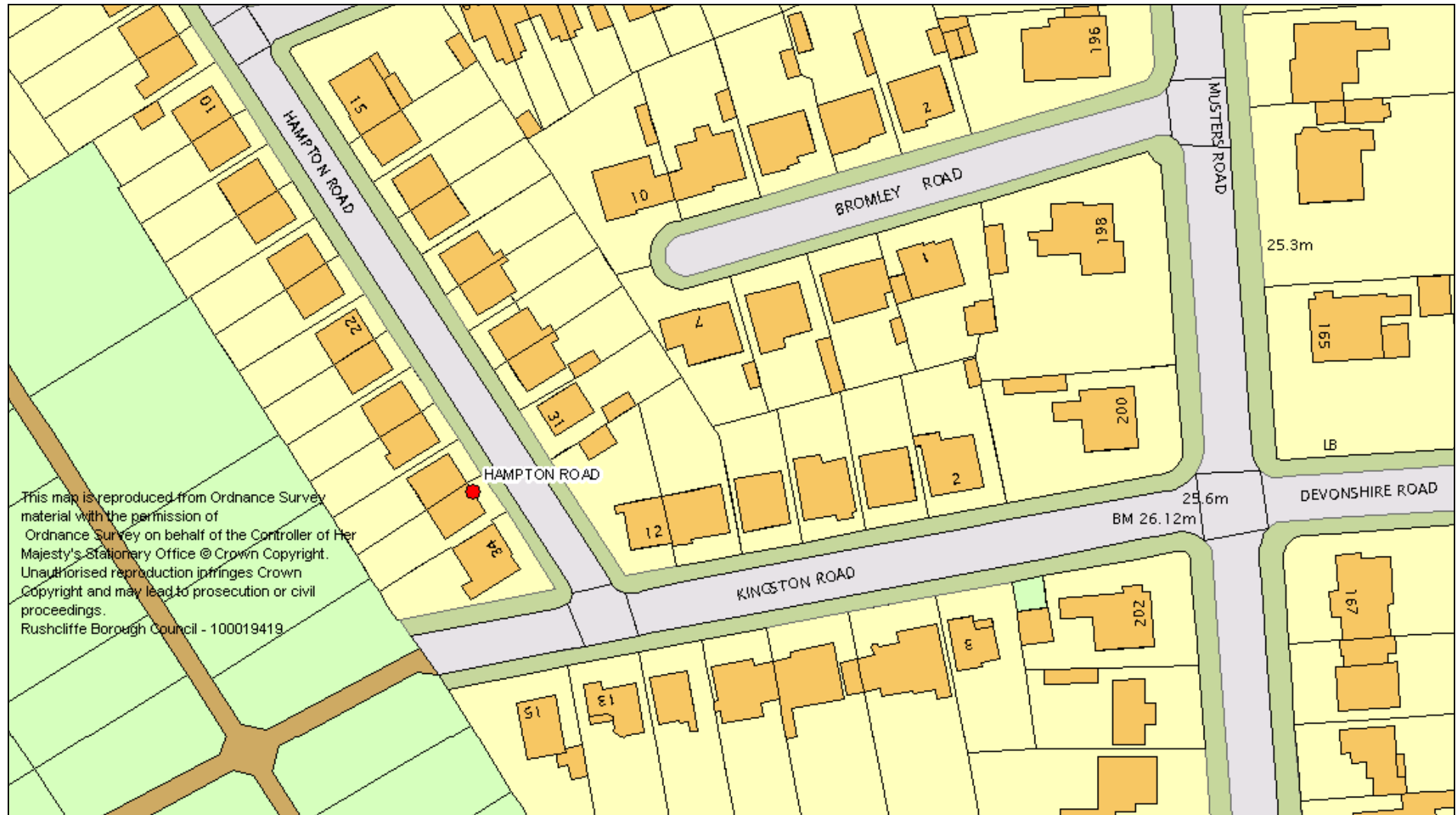
Map 2.11 Locations of Non-Automatic Monitoring Sites



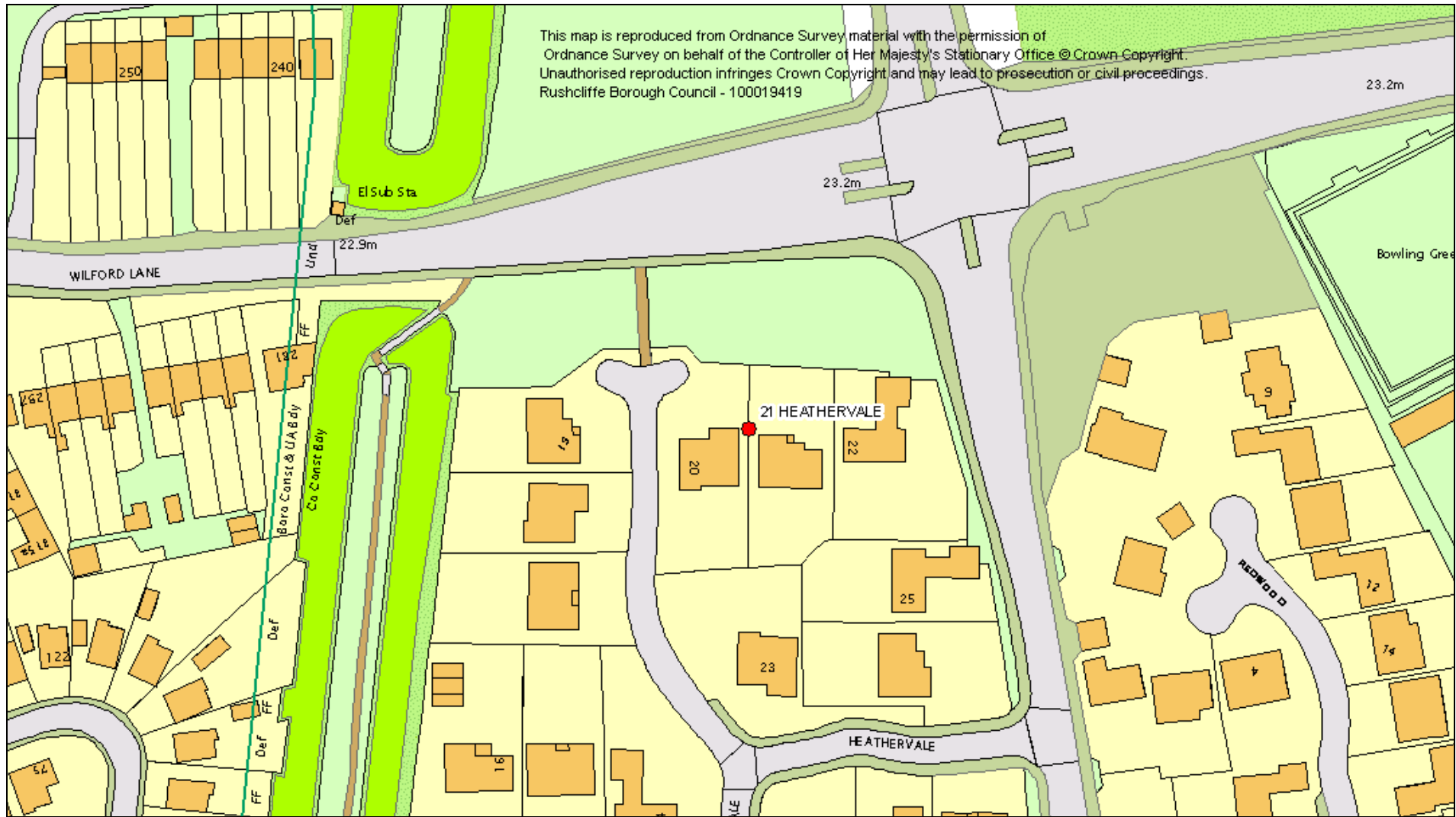
April 2010

Rushcliffe Borough Council

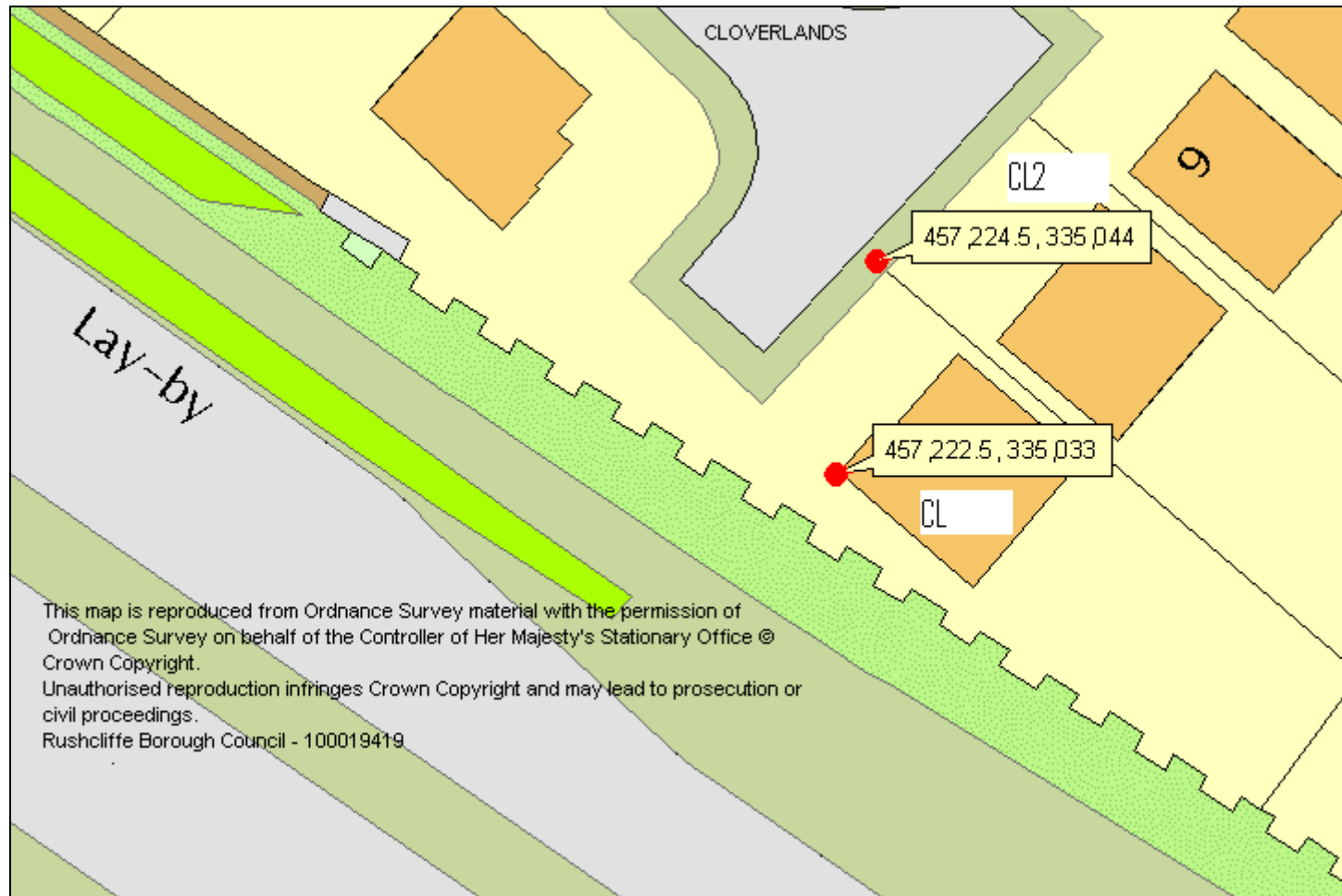
Map 2.12 Locations of Non-Automatic Monitoring Sites



Map 2.13 Locations of Non-Automatic Monitoring Sites



Map 2.14 Locations of Non-Automatic Monitoring Sites



Map 2.15 Locations of Non-Automatic Monitoring Sites

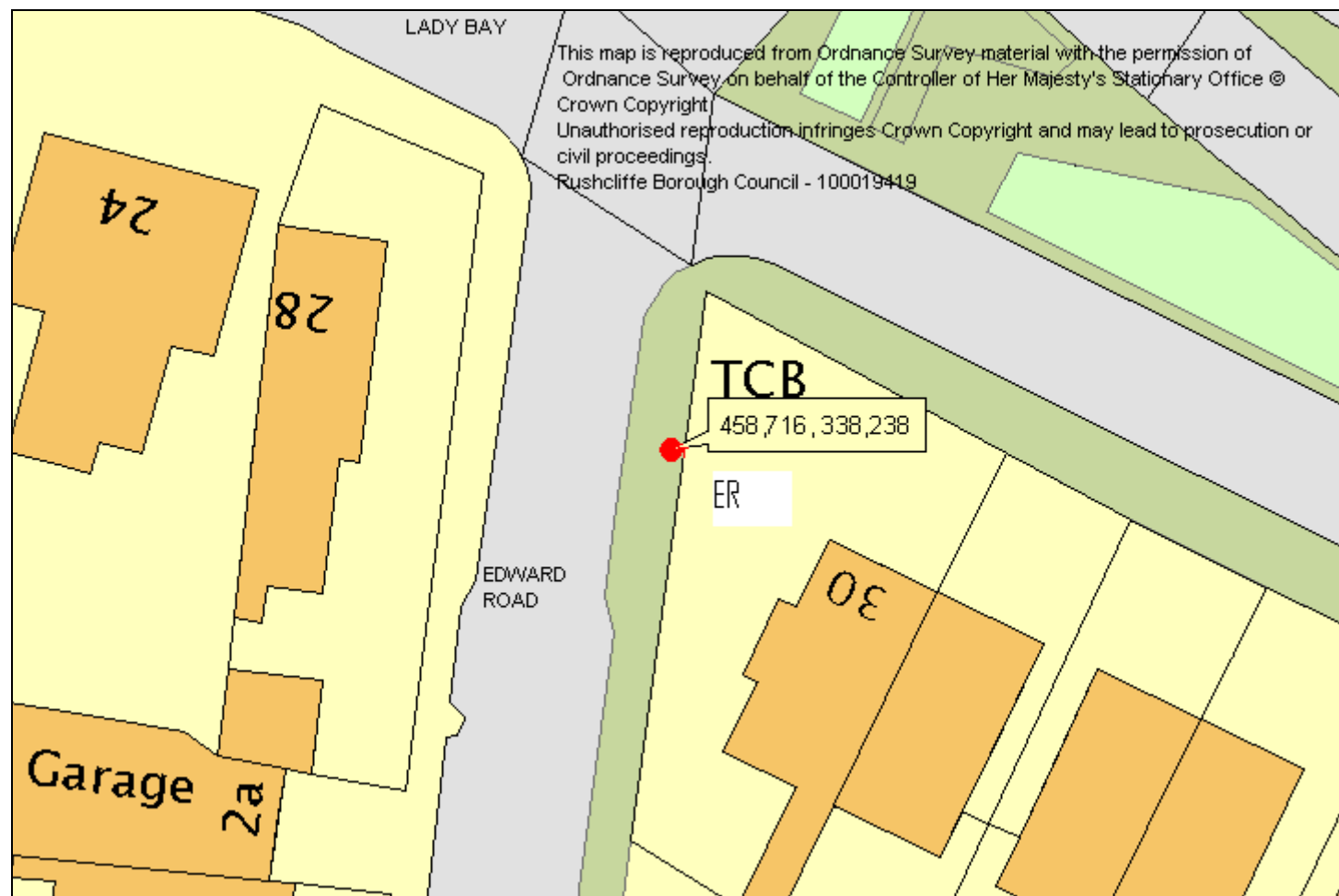


Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Short Name (Tube descriptor)	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  (N/A if not applicable)	Worst- case Location ?
							For annual limit	For 1 hr limit	distance		
1 LOUGHB'H RD W/B	NA1,NA2, NA3	Façade	458174	337772	NO <sub>2</sub>	1	Y	Y	0	5	Y
EDWARD ROAD, LADY BAY	ER	RS	458716	338238	NO <sub>2</sub>	1	Y	Y	0	10.5 from main road(2 from ER)	Y
LOUGHBOROUGH ROAD (RES)	LR	Façade	458126	337727	NO <sub>2</sub>	1	Y	Y	0	8.9	Y
PARTICULATE MONITOR	PM10	Façade	458090	337527	NO <sub>2</sub>	1	Y	Y	6.4	7.3	Y
RADCLIFFE ROAD	RR	Façade	458284	338150	NO <sub>2</sub>	1	N	Y	0	4	Y
SWANS HOTEL	SH	Façade	458919	338120	NO <sub>2</sub>	1	Y	Y	0	10	Y
THE POINT	POINT	Façade	458114	337518	NO <sub>2</sub>	1	Y	Y	0	7.4	Y
TRENT BOULEVARD A	TBLA	Façade	458752	338278	NO <sub>2</sub>	1	Y	Y	0	7.1	Y
TRENT BOULEVARD B	TBLB	Façade	458756	338267	NO <sub>2</sub>	1	Y	Y	0	3.4	Y
TRENT BRIDGE	TB	RS	458252	338146	NO <sub>2</sub>	1	N	N	n/a	0.1	Y
TRENT BRIDGE INN	TBI	Façade	458274	338117	NO <sub>2</sub>	1	N	Y	0	6.6	Y
TRENT HOUSE	THF, THF2	Façade	458227	338197	NO <sub>2</sub>	1	Y	Y	0	3.2	Y
WILFORD LANE 3	WL3	RS	458134	337581	NO <sub>2</sub>	1	Y	Y	5.2	2.1	Y
Radcliffe Road Acorn hotel lamp post	Roam(Acorn)	RS	458540	338218	NO <sub>2</sub>	1	N	N	6.5	2.6	Y
8 SALTBY GREEN	SG	Façade	456970	335222	NO <sub>2</sub>	2	Y	Y	0	29	Y



A60/A52 JUNCTION (Nott Knight)	NK	RS	457612	334813	NO <sub>2</sub>	2	N	N	n/a	1.8	Y
BOTANY CLOSE	A52/WB	RS	457222	335016	NO <sub>2</sub>	2	N	N	14.1	1.7	Y
3 BOTANY CLOSE	3BT	Façade	457266	335008	NO <sub>2</sub>	2	Y	Y	0	21	Y
CLOVERLANDS(Façade)	CL, CLa	Façade	457223	335033	NO <sub>2</sub>	2	Y	Y	0	16.3(from A52)	Y
CLOVERLANDS 2 (Lamp post)	CL2	RS	457225	335043	NO <sub>2</sub>	2	Y	Y	5.3	2m from CL (26.3 from A52)	Y
LANDMERE NURSING HOME	LL	Façade	456785	335359	NO <sub>2</sub>	2	Y	Y	0	31.5	Y
WINDYWAYS	WW	RS	457651	334840	NO <sub>2</sub>	2	Y	Y	0	12	Y
A453	A453	RS	451697	330925	NO <sub>2</sub>	no	Y	Y	23.8	3.2	Y
A46 EAST BRIDGFORD	A46/EB, A46/EB2	Façade	470371	342046	NO <sub>2</sub>	no	Y	Y	0	12	Y
A52 LINGS BAR Hospital	GLB HOS	Façade	460663	336514	NO <sub>2</sub>	no	Y	Y	0	26	Y
A52 SAXONDALE	A52/S	RS	466630	339652	NO <sub>2</sub>	no	Y	Y	10	1.5	Y
A52 SOUTH AVE, RADCLIFFE	A52/SA	RS	465929	335543	NO <sub>2</sub>	no	Y	Y	0	4.2	Y
A52 HOME HOUSE, STRAGGLETHORPE	A52/HH	RS	463008	338215	NO <sub>2</sub>	no	Y	Y	3.5	2.9	Y
RADCLIFFE A52	A52/RT	RS	464644	338730	NO <sub>2</sub>	no	Y	Y	5.2	3.3	Y
A52 HOME HOUSE(façade) STRAGGLETHORPE	A52/HHF1, A52/HHF2, A52/HHF3	Façade	463011	338213	NO <sub>2</sub>	no	Y	Y	0	6.4	Y
STRAGGLETHORPE ROAD	SR	Façade	463005	338204	NO <sub>2</sub>	no	Y	Y	0	5.5	Y
21 HEATHERVALE	HV	Façade	456893	336768	NO <sub>2</sub>	no	Y	Y	0	36	N
34 BRIDGFORD ROAD	BR	Façade	458501	337854	NO <sub>2</sub>	no	Y	Y	0	10	Y
39/41 WILFORD LANE	WLR/2	Façade	457873	337426	NO <sub>2</sub>	no	Y	Y	0	9	Y
HAMPTON ROAD	HR	UB	458326	336714	NO <sub>2</sub>	no	Y	Y	0	5.4	Y

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HICKORY HOUSE	HH	RS	458049	337340	NO <sub>2</sub>	no	Y	Y	0	10.5	Y
MIDLANDS COMM (Radcliffe Rd)	MC	Façade	458453	338211	NO <sub>2</sub>	no	Y	Y	1	10.5	Y
37 RADCLIFFE ROAD	37RR	Façade	458457	338215	NO <sub>2</sub>	no	Y	Y	0	13.8	Y
PEVERIL COURT	PC, PC2	Façade	458399	337172	NO <sub>2</sub>	no	Y	Y	0	8	Y
THE BEECHES HOTEL	BH	Façade	457701	337342	NO <sub>2</sub>	no	Y	Y	0	9.7	Y

## **2.2 Quality Control (QA/QC)**

It is essential to ensure that all data collected is accurate, reliable and comparable and have high data capture rates. It is therefore important to apply consistent quality control and assurance procedures. The aim of this document is to outline the main quality assessment and quality control procedures used in Rushcliffe BC to determine air quality data for use in the local air quality management process.

### **2.2.1 Air quality operators**

All monitoring and data management is undertaken by fully trained in house employees who have several years experience in air quality monitoring and data management. Any new personal will undertake appropriate supervised training in line with the department's competency scheme prior to any unsupervised monitoring, calibration or data management. Currently two personal are trained and competent to undertake such work this includes, Martin Hickey EHO and John Pembrington Technical Officer.

### **2.2.2 Diffusion Tube Monitoring**

Rushcliffe use diffusion tubes prepared using 20%TEA in water to measure nitrogen dioxide at a number of sites in the borough. The diffusion tubes are stored in an airtight bag in a refrigerator upon receipt in the post and are used within 6 weeks of the preparation date displayed on the label.

Tube batches are exposed at selected sites to the atmosphere for approximately 4 weeks with the change over date aiming to be +/- 1 day of the publicised diffusion tube change over date for the month to allow comparison with other Local Authority studies if necessary. The locations have are reviewed periodically and all tubes are mounted using spacer brackets and grommets supplied through Gradko.

Each tube is labelled with a bar code and unique identification number. Each batch is supplied with a data collection form to record the location, date and time each tube is exposed in that period. The exposure period is calculated using an excel spreadsheet and in addition Gradko recheck the calculated exposure period for each tube on receipt at the laboratory.

On the day of collection, the tubes are sent in an air tight bag to Gradko International Limited for analysis, together with a control blank that is stored unexposed in the sample fridge. The diffusion tubes are analysed within the scope of Gradko International Ltd Laboratory Quality Control Procedures utilising in-house method GLM7. Gradko is a UKAS accredited laboratory and undertakes diffusion tube monitoring on the same basis for a number of other Local Authorities and Environmental Consultants and now undertakes the monitoring for all LA in the Nottinghamshire Pollution Working Group.

Nitrogen Dioxide absorbed as nitrite by triethanolamine is determined by spectrophotometric measurement at 540 nanometers. Nitrite reacts with an added reagent to form a reddish purple azo dye and the optical density of this complex is measured using a Camspec UV/Visible Spectrophotometer. The concentrations of nitrogen dioxide are then calculated from a pre-calibrated response factor and exposure times. The values are not blank corrected, using the blank "control" diffusion tube provided by Rushcliffe Borough Council.

Gradko adopt the following procedures, to ensure the results of the analysis are within the accepted accuracy range:-

- Prior to each tube analysis undertaken, nitrite solutions ranging from 1-2ppm made up from a standard stock solution are run and checked against a calibration graph.
- Every month a full range of nitrite standard solutions ranging from 0.5-4ppm are measured and compared against the instrument calibration graph.
- Periodically, samples of tubes prepared for exposure are spiked with known concentrations of nitrite solution and measured. Blank tube values are also monitored from each new batch of tubes prepared.
- Once per month, a stock solution containing a known amount of nitrite, is received from AEA Technology Environment and measured. The results are used as part of the UK NO<sub>2</sub> Survey QA/QC Scheme. This stock solution is then used by Gradko to check the u.v. spectrophotometer calibration graph.

The accuracy of the measurements made by Gradko are also monitored by participation in an external laboratory measurement proficiency scheme, the 'Workplace Analysis Scheme for Proficiency' (WASP), implemented by the Health and Safety Laboratory, Sheffield.

The analysis is carried out in accordance with Gradko International Ltd, Internal Laboratory Quality Procedure GLM 7, and within their U.K.A.S. Accreditation Schedule.

### **Data Ratification**

All diffusion tube data is checked on a monthly basis to identify any spurious data and compared with other local monitoring sites to further identify any suspect data.

Ratified diffusion tube monitoring data are reported in this document have been biased adjusted using the correction factor derived from the collocation of tubes at the continuous monitoring analyser at Loughborough Road, West Bridgford using the method set out in technical guidance 09 and available from [http://www.airquality.co.uk/laqm/tools/AEA\\_DifTPAB\\_v03.xls](http://www.airquality.co.uk/laqm/tools/AEA_DifTPAB_v03.xls) unless otherwise stated.

### **2.2.3 Gravimetric Monitor**

The gravimetric sampler is a Sven Leckel 47/50 gravimetric monitor and is compliant with BS EN 123412, as an EC reference method. It has therefore been certified as "equivalent." In 2009 the original Sven Leckel was renewed for a new Sven Leckel 47/50. This new monitor operates in the same way as its predecessor and remains certified. The changes to the monitor now enable a cable link to the monitor to download the monitoring parameters to a laptop and the cartridge has a maximum

capacity of 17 filters (instead of the 15 filters), although Rushcliffe continue to order filters 15 at a time from the laboratory.

The sampler operates by drawing a metered ambient air sample through a size selective inlet head by a vacuum pump, thus enabling the particles to be trapped on a filter for later weighing. Each filter is exposed for a 24-hour period and is then automatically changed at midnight each day until the inlet cartridge is empty. Exposed filters are moved to a collection cartridge after exposure.

### **Filter handling procedures**

Filters are supplied by TES Bretby (UKAS Accredited and HSE Approved Laboratory) in individual metal containers already in the filter housing and able to be placed in the monitor without touching the filter surface. Each filter housing is identified by a number (e.g. RBC1) and each filter has a unique number to keep track of the pre-weighed value. The exposed filters and record sheets are returned to the laboratory for re-conditioning, re-weighing and the necessary calculations to determine the mass collected on the. The returned form contains the date of exposure, the air flow sampled, the length of time of exposure, the filter reference number and the mass of PM10 in  $\mu\text{g}/\text{m}^3$ .

In order to improve on data capture filters may be removed from the sampler and new filters added before the entire batch has been exposed. If this is the case any exposed filters are placed back in the travel container, sealed in an air tight bag and stored in the sample fridge until all filters in the batch have been exposed and collected. When all filters in the batch of 15 have been exposed and collected they are then sent for analysis in an air tight bag by post as soon as possible.

If all the filters in the housing have been exposed the sampler will automatically cease sampling. If this is the case the operator will re load the inlet cartridge and set the sampler to begin sampling from the next midnight.

The operator will visit the monitor at least once every two weeks but in practice this may be more frequent.

The laboratory in-house method is based on the HSE document MDHS 14/2 'General methods for the sampling and gravimetric analysis of respirable and total inhalable dust'. The filters used are QMA 47 and are stored and weighed in an air-conditioned balance room.

All filters are conditioned for at least 12 hours prior to weighing and re-weighing in the laboratory. They remain under the influence of an ionised air source, in order to minimise the influence of static electricity, immediately prior to weighing. The filters are then weighed on "Sartorius" micro-balances that have a readability of  $1\mu\text{g}$ . The final results are recorded and submitted on UKAS accredited test reports.

### **Monitor checks and maintenance**

At each visit to the monitor to change the filters the grease trap in the inlet is cleaned and fresh grease applied. Upon download of the parameters each filters hours of exposure and volume of air sampled is examined to determine if any unusual values have occurred. If so the operator will investigate the cause and take appropriate action.

The monitor is under a service contract with the supplier Enviro Technology PLC and receives 2 service visits annually at which time preventative maintenance and cleaning takes place as well as a flow calibration.

## Data handling

Reports from TES Bretby are received via email and the data is transferred manually on to an excel spreadsheet. From the spreadsheet the annual mean, data capture rate and number of days above the AQO is determined. As the sampler is an EU approved sampler no corrections are required to be made to the reported particulate results and direct comparison with the AQO's can be made.

### 2.2.4 NOx Continuous Analyser

#### Description of Analyser

The NOx continuous analyser is located at the façade of 43 Loughborough Road, West Bridgford and is a permanent site. The site is non residential but provides a good assessment of NO<sub>2</sub>/NO<sub>x</sub> close to the main road along the building line. It is a Monitor Europe ML9841B single chamber chemi-luminescence analyser and is approved by TUV, US EPA and NETCEN.

The analyser has a resolution of 0.001ppm and a reported lower detectable limit of <0.5ppb. The linearity error of the analyser is  $\pm 1\%$  of the full scale (from best line fit), and the precision is 0.5ppb or 1% of concentration reading (whichever is the greater). The analyser is covered by a service and maintenance contract with Casella Measurement, and covers calibration checks, flow and leak checks, cleaning of components, analyser diagnostic checks, replacement of faulty components and consumables and fault call out.

From February 2010 the monitor and enclosure has been renewed but kept at the same location. Data reported in this document is unaffected by the monitor upgrade. The new monitor remains a ML9841B NO<sub>x</sub> Analyser with IZS and for 2010 is installed into a Romon 300 roadside enclosure with air conditioning.

#### Instruments Checks and Calibration of the Analyser

##### Daily automatic calibration

Zero air is generated by passing air through scrubbers and passed through the reaction cell. Span gas is generated by a permeation tube and passed to the reaction chamber to give the span calibration response.

The daily automatic calibrations are used as a check on the instrument performance and drift.

##### Analyser inspection and manual calibration

Manual calibrations are carried out on a fortnightly basis using scrubbed zero air derived from the integrated scrubber column and a certificated NO/NO<sub>x</sub> calibration gas is supplied by BOC Gases.

The analyser is taken out of service and the inlet filter is changed prior to connecting the calibration gases. The zero air and NO/NO<sub>x</sub> gases are run through the analyser and the responses noted together with the instrument gain factor. The output of the analyser (e.g. the gain) is only reset or altered following equipment service or repair or if drift occurs necessitating a change of the gain setting. The calibration zero values, span values and gas certified values are used to rescale the raw data received from the analyser.

Data is downloaded daily using a modem connection to a remote server and is accessed for viewing, ratification and rescaling purposes using a proprietary software package, Envista Arm.

Data is downloaded in PPB and visually inspected for negative values, missing data sets and spurious results.

Initial scaling factors are determined for NO and NO<sub>x</sub> using the following formulas based on the fortnightly calibration checks.

$$\text{Scaling Factor "A"} = \frac{\text{Expected (Known) Cylinder Concentration}}{\text{Measured Concentration} - \text{Measured Zero}}$$

$$\text{Scaling Factor "B"} = - \text{Measured Zero Value}$$

To rescale the NO value the "A" scaling factor for the fortnightly period in question is multiplied to each 15 minute data set for NO in the database. Subsequently the "B" scaling factor is added to the same period of data to address any zero drift noted at the calibration check.

If any zero values are still present the data block is further rescaled to remove any zero values

The same procedure is then carried out with the NO<sub>x</sub> data using calculated "A" and "B" factors for NO<sub>x</sub> over the same periods.

To calculate the rescaled NO<sub>2</sub> 15 min values a calculation is then run on the PPB data base using the following equation:

$$\text{NO}_2 \text{ concentration} = \text{NO}_x \text{ concentration} - \text{NO concentration. (in PPB)}$$

These calculations are undertaken in PPB before any conversion to micrograms. NO<sub>2</sub> and NO<sub>x</sub> are converted to micrograms by a conversion factor of 1.91. NO is converted to micrograms by a conversion factor of 1.25.

## 2.2.5 Data Handling and Ratification

### Data handling

Raw data is downloaded via a modem connection automatically every 24hours into the Envista Arm remote server database. This data can be viewed by all the Nottinghamshire Local Authorities who are part of the network however only data can be manipulated in the database that belongs to the respective LA. Data is currently being maintained under contract by the software supplier engaged through Casella Stanger and data integrity and security is part of this contract arrangement. In addition the data, both raw and ratified is published on the following web page <http://www.nottinghamaqm.net/Default.htm>

### Data ratification

All raw data is examined for consistency and the existence of any spurious results. Negative values are examined and either removed or rescaled further and high values are interrogated to see if the readings are consistent with expectations or an equipment error may have occurred. Data during calibration checks is automatically

excluded from the database by a software service switch on the instrument panel which is used during calibration checks.

If any doubts exist as to the satisfactory status of any data the data is excluded from the data base calculations, although the Envista Arm software allows the data to remain in the database and marked as 'not used' enabling recovery of any excluded data should that be considered necessary. Each data set that is excluded must have annotated against it a reason for the data exclusion to allow for traceability of data ratification. The most common reason for data being excluded is monitor breakdown leading to consistently low or very high readings. However, power failure can also be a cause as well as any specific events noted by officers during visits. E.g. trucks being run next to the monitor for maintenance of the building façade or similar.

Information from the other analysers on the system can also be accessed to compare any data that may be experiencing high or low readings to enable a decision to be made on the status of any data highlighted. This includes the AURN monitors operated by the Nottingham City.

Envista has built in reports that enable a number of parameters to be determined on the ratified or raw datasets as required.



## 2.3 Comparison of Monitoring Results with Air Quality Objectives

### 2.3.1 Nitrogen Dioxide

#### Automatic Monitoring Data

Rushcliffe Borough Council currently operates a chemi-luminescence analyser for NO<sub>2</sub> at Loughborough Road, West Bridgford. The analyser is subject to daily automatic calibrations and fortnightly manual calibrations as detailed in the QA/QC procedures of this report. Results for 2009 annual means are shown below along with the previous two years data. The results suggest that at the monitoring location inside the AQMA met the AQO. The monitor is used to calculate a local bias factor for diffusion tubes in the borough. Site data capture was less than in previous years due to power failures, data loss and instrument breakdown in 2009. The monitor has been renewed in 2010 to remedy this issue. Data capture covers the 12 month period, although some months have low data capture values; overall data capture is above the 75% minimum and so has been used in this report to determine a local bias factor. The 2009 annual mean for the monitor has not been annualised as the data capture incorporates data from periods throughout the year.

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

Site ID	Location	Within AQMA ?	Data Capture for monitoring period <sup>a</sup> %	Data Capture for full calendar year 2009 <sup>b</sup> %	Annual mean concentrations (µg/m <sup>3</sup> )		
					2007 <sup>c, d</sup>	2008 <sup>c, d</sup>	2009 <sup>c</sup>
NOx monitor	Loughborough Road/ Milicent Road	Y	77	77	43.2 (89% DC)	38.4 (88% DC)	34.10 (77% DC)

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

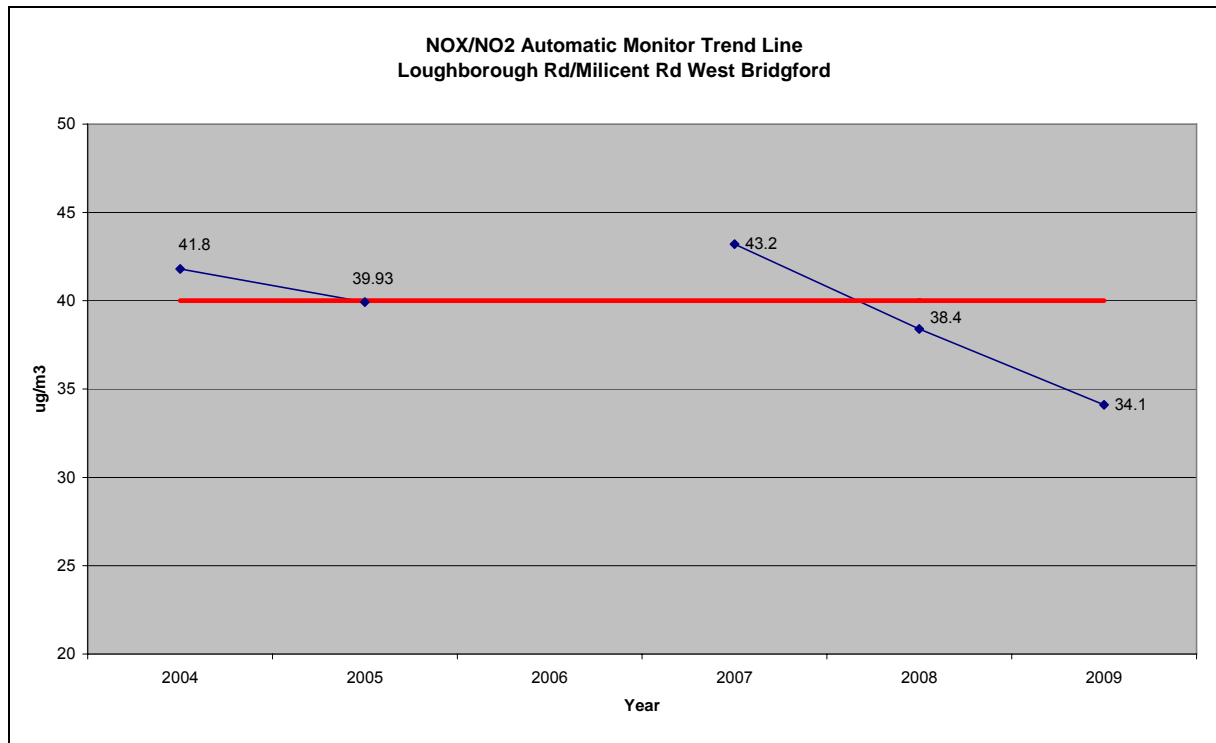
<sup>b</sup> i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

<sup>c</sup> Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

<sup>d</sup> Annual mean concentrations for previous years are optional.

**Figure 2.1 trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites.**

The chart below shows graphically the annual means from the automatic monitoring site. 2006 data is omitted due to lack of data capture for this year. The chart illustrates a fall at this location in the last 3 years.



**Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective**

Site ID	Location	Within AQMA?	Data Capture for monitoring period <sup>a</sup> %	Data Capture for full calendar year 2009 <sup>b</sup> %	Number of Exceedences of hourly mean (200 µg/m <sup>3</sup> )		
					2007 <sup>c</sup>	2008 <sup>c</sup>	2009
(1 l'borough Rd) NOx monitor	Loughborough Road/ 43 Milicent Road	Y	77	77	0	2	0
							99.8 <sup>th</sup> percentile = 62.7

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

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

<sup>c</sup> Numbers of exceedences for previous years are optional.

The measured annual mean of the continuous monitor is below the AQO of 40 µg/m<sup>3</sup>. The site has not had any exceedences of the 200 µg/m<sup>3</sup> hourly limit in 2009.

The monitor has been in the same location since its installation and is representative of the building line along Loughborough although the building it is immediately adjacent to is not a relevant receptor for the annual mean.

**Diffusion Tube Monitoring Data**

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes, below, shows the bias adjusted diffusion tube results undertaken in Rushcliffe in 2009 and the previous year's results where tubes have been sited in the same locations over past years. Tube averages that exceed the AQO have been highlight in the right hand column. It should be noted however, that a number of these sites are not located on receptor locations and as such a further adjustment is required to allow for the fall off with distance prior to comparing the result with the AQO. Appendix D contains a table showing the monthly diffusion tube results for the year for all sites. A few sites were changed in November 2009 and as such the results are from November and December 2009 periods only. This being the case the results only provide an indication of the level of exposure at the site and is considered too small a sample to annualise the results. The sites affected will remain in place through 2010 and will have good data set in 2010 to report. Those sites that have ended in 2009 again have not been annualise as the sites exceed the 9 month minimum to require annualising and are considered representative of the 2009 year.

Figure 2.2 to Figure 2.4 shows the trend in the NO<sub>2</sub> diffusion tube results. The charts show diffusion tubes results in AQMA1, AQMA2 and in non AQMA sites respectfully to aid interpretation. Those results in red are above the AQO and where the row has been highlighted indicates the tube result is above the 60 µg/m<sup>3</sup> average. Some sites however will still require correcting to the nearest relevant exposure before comparing to the AQO.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	within AQMA?	2009 Data Capture for monitoring period <sup>a</sup>	Data Capture for full calendar year 2009 <sup>b</sup>	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ )					Comment
			%	%	Bias adjusted mean $\mu\text{g}/\text{m}^3$ (1.07) <sup>d</sup> (2005) <sup>d</sup>	Bias adjusted (0.96) Mean $\mu\text{g}/\text{m}^3$ (2006) <sup>d</sup>	Bias adjusted (1.03) Mean $\mu\text{g}/\text{m}^3$ (2007) <sup>d</sup>	Bias adjusted (0.91 & 0.92) Mean $\mu\text{g}/\text{m}^3$ (2008) <sup>d</sup>	Bias adjusted (0.95) Mean $\mu\text{g}/\text{m}^3$ (2009) <sup>c</sup>	
NA1/2/3	1 Loughb' R, WB ( Mon)/Milicent rd	1	92%	92%	39.0	35.9	43.3	35.7	34.2	3 tubes
ER	EDWARD ROAD, LADY BAY	1	100%	100%	REPLACES LB NEW IN 2009				34.5	
LR	Loughb' , WB. (Res)	1	100%	100%	45.1	36.1	45.8	40.0	35.3	
PM10	Particulate Mon	1	92%	92%	33.2	34.2	39.7	32.1	33.9	
RR	Radcliffe Road, WB.	1	100%	100%	50.1	43.6	51.4	38.6	40.1	
SH	Swans Hotel	1	100%	100%	36.7	31.0	34.6	31.2	32.8	
POINT	The Point	1	100%	100%	38.6	32.4	37.3	29.5	29.1	
TBLA	Trent Boulevard A	1	100%	100%	42.6	37.5	44.4	38.5	37.0	
TBLB	Trent Boulevard B	1	100%	100%	44.1	43.6	50.6	38.0	40.3	
TB	Trent Bridge(RS)	1	100%	83%	65.4	57.9	70.2	59.6	59.0	ended oct 2009
TBI	TRENT BRIDGE INN	1	100%	17%	REPLACES TB NEW IN 2009				54.0 (annualised = 44.6)	started nov 2009
THF & THF2	Trent House (Res)	1	100%	100%	52.8	44.7	52.5	39.6	43.3	2 tubes 8% with 2 tubes
WL3	WILFORD LANE 3	1	92%	92%	REPLACES WL NEW IN 2009				44.0	
Roam(Acorn)	Roam(Acorn hotel lamp post)	1	100%	75%	APRIL TO DEC 09 ONLY THEN ENDED				41.2	
SG	Saltby Green	2	83%	83%	32.6	29.0	34.3	26.9	27.0	
NK	A60/A52 Junction(RS)	2	92%	92%	51.8	49.3	56.9	48.2	49.3	
A52/WB	A52 Botany Close(RS)	2	80%	67%	53.1	51.0	62.2	57.6	58.6	ended Oct 2009
3BT	3 BOTANY CLOSE	2	100%	17%	REPLACES A52/WB NEW IN 2009				36.5 (annualised = 30.2)	started Nov 2009

CL/C1a	Cloverlands	2	92%	92%	43.6	39.8	48.0	44.2	38.5	8 % with 2 tubes
CL2	CLOVERLANDS 2 (Lamp post)	2	80%	67%	ONLY IN 2009 8 MONTHS CAPTURE				29.5	
LL	Landmere	2	100%	100%	39.7	27.8	30.9	27.5	29.2	
WW	Windyways	2	100%	100%	40.1	41.2	44.0	39.3	38.8	
HV	Heathervale	no	100%	100%	32.2	29.8	33.3	29.4	29.5	
BR	Bridgford Road	no	92%	92%	33.9	29.1	34.9	27.1	27.6	
WLR/2	Wilford Lane (Res)	no	100%	100%		30.4	34.0	30.4	30.1	
A453	A453, Thrumpton(RS)	no	100%	100%		44.6	49.7	44.9	44.2	
A46/EB & A46/EB2	East Bridgford	no	100%	100%		37.4	43.7	30.1	27.4	2 tubes
GLB HOS	A52 Lings bar Hospital	no	100%	100%	replaces GLB new 2009				22.5	
A52/S	Saxondale(RS)	no	100%	100%		35.4	46.0	36.6	36.9	
A52/SA	A52 SOUTH AVE, RADCLIFFE	no	92%	92%	NEW IN 2009				34.8	
HR	Hampton Road	no	92%	92%	25.3	20.8	25.3	21.7	21.8	
HH	Hickory House	no	100%	100%	33.5	30.6	33.5	28.9	29.8	
MC	Midlands Comm	no	83%	83%	50.1	40.7	48.2	40.6	40.6	ended oct 2009
37RR	37 RADCLIFFE ROAD	no	100%	17%	REPLACES MC NEW IN 2009				35.2 (annualised = 29.1)	started nov 2009
PC & PC2	Peveril Court	no	100%	100%	37.8	32.1	39.7	30.3	30.1	2 tubes
A52/RT	Radcliffe on Trent(RS)	no	100%	100%		44.7	47.9	42.6	39.1	
BH	The Beeches Hotel	no	100%	100%	33.7	32.2	38.7	33.1	29.9	
A52/HH	A52 HOME HOUSE, STRAGGLETHORPE	no	100%	83%	NEW IN 2009				61.6	jan to oct 2009
A52/HHF/1 2 3	A52 HOME HOUSE(façade) STRAGGLETHORPE	no	100%	17%	NEW IN 2009				51.3 (annualised = 42.4)	3 tubes started Nov 2009 for Detailed assessment
SR	STRAGGLETHORPE ROAD	no	100%	17%	NEW IN 2009				36.3 (annualised = 30.0)	started Nov 2009 for detailed assessment

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

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

<sup>c</sup> Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year. Annual mean

<sup>d</sup> concentrations for previous years are optional

**Figure 2.2 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.**

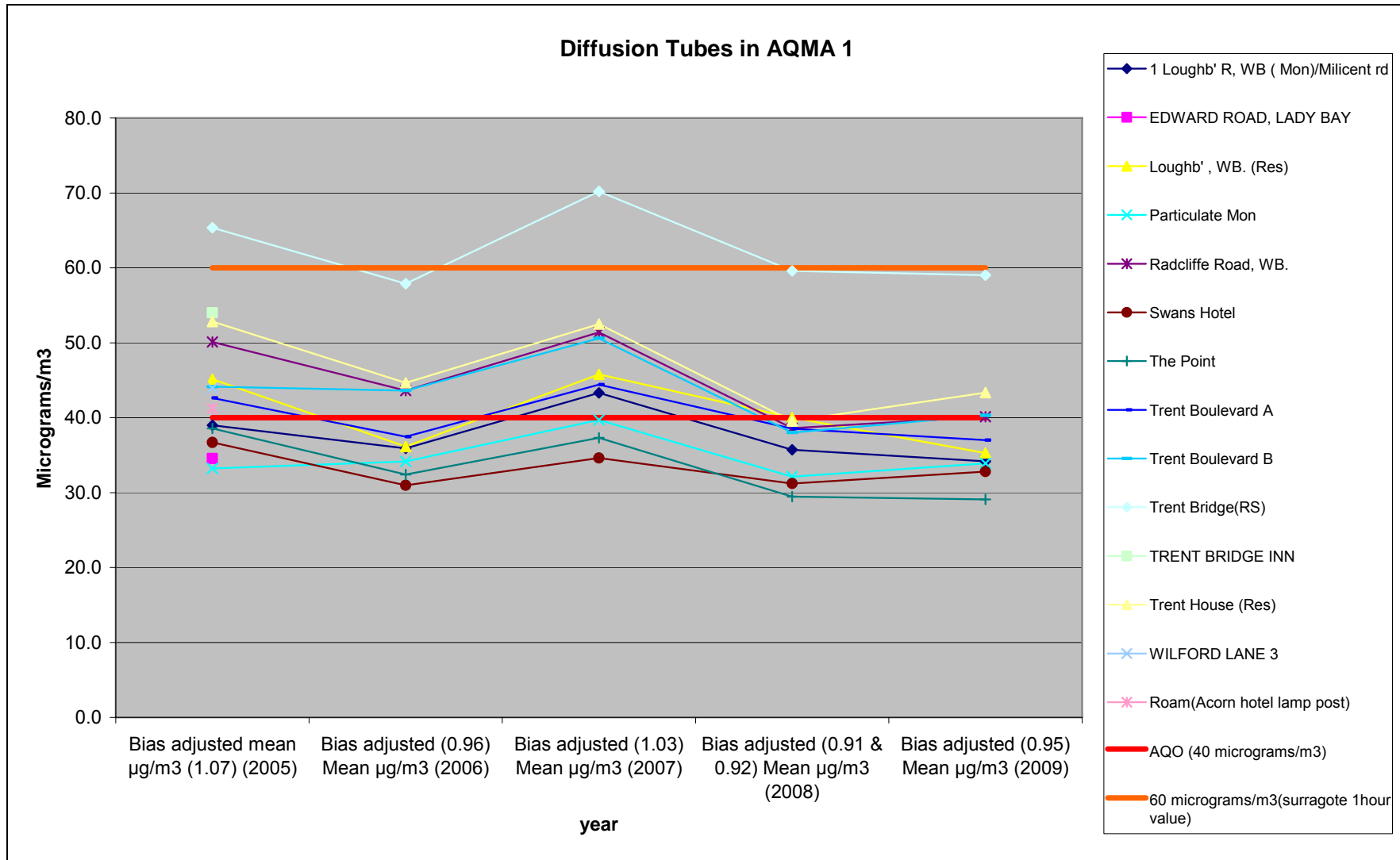
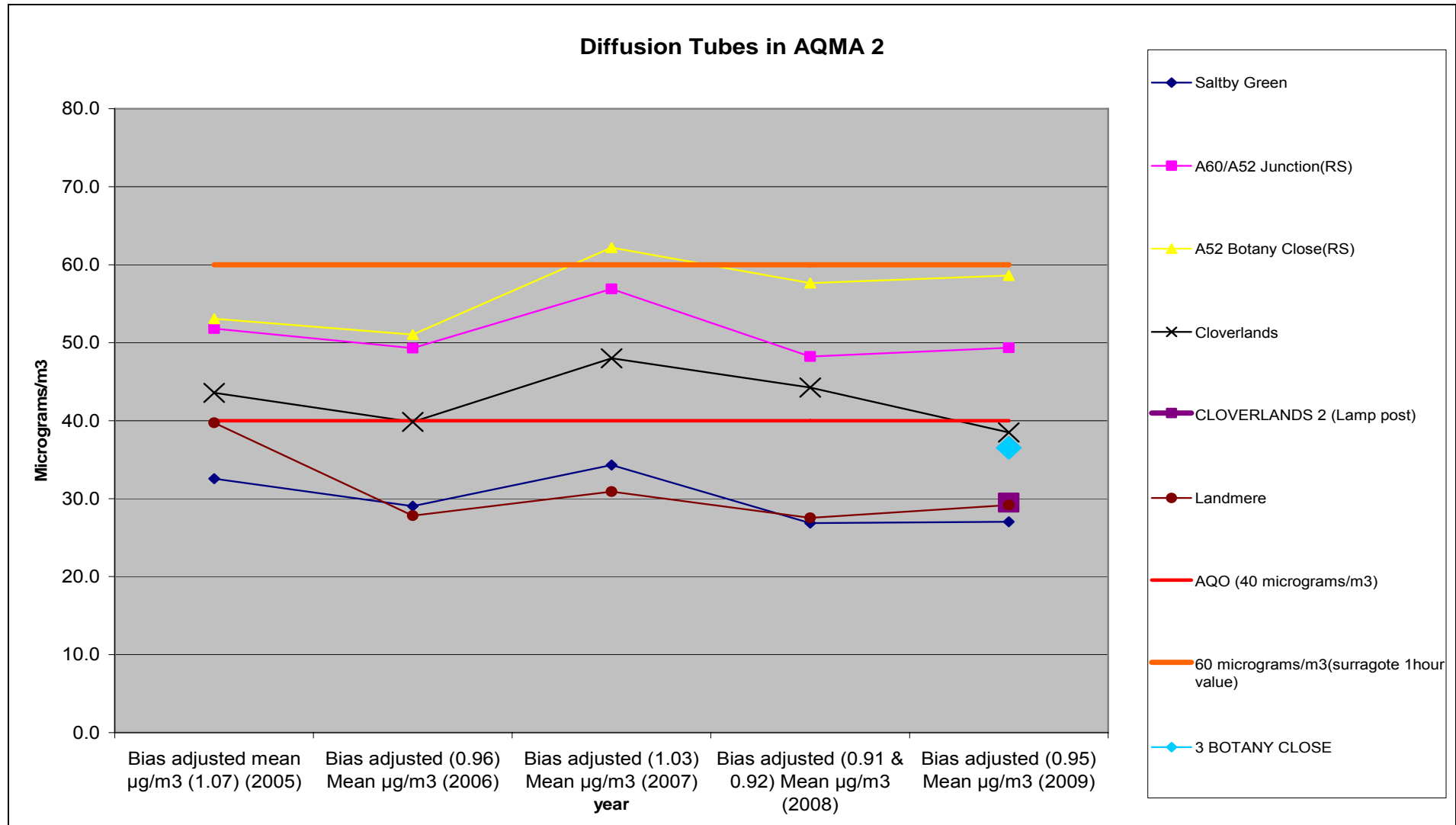
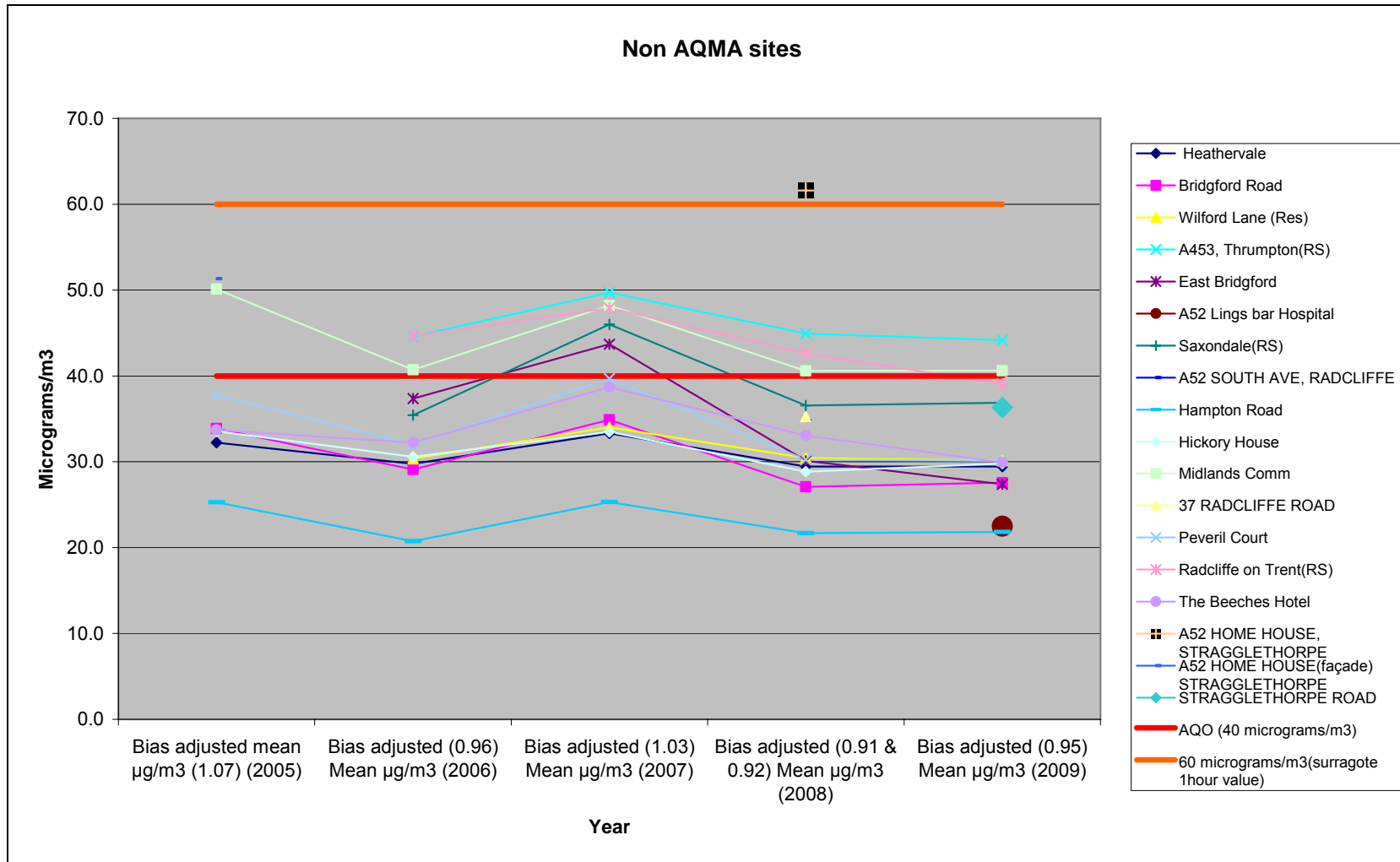


Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring sites.





**Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring sites.**



### Diffusion tubes in AQMA 1

14 monitoring locations for diffusion tubes were assessed in 2009 with several of the results indicating results below the  $40 \mu\text{g}/\text{m}^3$  annual mean. Unless otherwise stated results for diffusion tubes are bias adjusted. Those exceeding the annual mean are highlighted in red in Table 2.5 above and consist of 7 diffusion tube sites. Sites in the AQMA 1 are discussed below with particular reference to those still indicating high levels and any changes that have taken place in the last year.

Previously, monitoring has been undertaken within the pedestrian crossing island at the junction of Radcliffe Road and Trent Bridge, this site being identified as Trent Bridge (TB). In 2009 this resulted in a very high  $59 \mu\text{g}/\text{m}^3$ . However, recommendations from the previous R&A report (USA 2009) were that this tube should be moved to reflect better relevant exposure. As such a new site was established at the Trent Bridge Inn Public House façade, (TBI) this being considered the closest relevant exposure to this junction. This monitoring location is where people do congregate outside at various times of the year and is a relevant exposure when considering the 1 hour exposure to NO<sub>2</sub> and not the annual mean. The results for 2009 indicate that the Trent Bridge (TB) tube experienced a  $59 \mu\text{g}/\text{m}^3$  annual mean over a 10 month period. The new TBI tube was set up in November 2009 and has only been exposed for 2 months with a mean of  $54 \mu\text{g}/\text{m}^3$ . Working on the assumption that the TBI will not be worse than the TB site (as the TBI is further from the traffic stream) a weighted average of the 12 tubes from the 2 sites should represent a worse case scenario for exposure at the TBI over the whole year.

$$59 \times 10/12 + 54 \times 2/12 = 58.2 \mu\text{g}/\text{m}^3$$

Using the method set out in TG(09) box 3.2 an annualised value of  $44.7 \mu\text{g}/\text{m}^3$  is calculated by multiplying the 2 month mean of 54 by the calculated annualising factor of 0.827. this figure would appear to be lower than our understanding of the junction but is included as this is the preferred method of calculation. In any case the annualise level is well below the  $60 \mu\text{g}/\text{m}^3$  surrogate level.

This being  $58.2 \mu\text{g}/\text{m}^3$ , calculated above is also below the  $60 \mu\text{g}/\text{m}^3$  surrogate value for the 1 hour value. As such Rushcliffe do not expect exposure at the TBI to be in breach of the 1 hour limit for NO<sub>2</sub> and not being a site of relevant exposure for the annual mean this site meets the AQO. The site is however already in AQMA and will benefit from the AQAP in place.

The new TBI tube will remain in place and will be reported on in further review and assessment rounds to remove any error in the methodology used above. The TB tube not being a relevant receptor makes it difficult to draw any firm conclusion from this site other than the junction at the kerb experiences high levels of NO<sub>2</sub>.

The Radcliffe Road tube is site on the façade of shop approx 2.1-2.2 metres from ground level. There are no relevant exposures to the annual mean at ground floor level in this area as the frontage is populated by shops, although seating area does exist for a café (2-3 seats). However at first floor level several buildings above shops have permission to be residential although it is unclear at the moment as to whether some are in occupation or not. This tube has shown a slight increase on last years results of  $38.4 \mu\text{g}/\text{m}^3$  and has reached an annual mean of  $40.1 \mu\text{g}/\text{m}^3$  which is a marginal exceedence of the annual mean AQO. Given that at first floor level it is

expected that NO<sub>2</sub> levels will be slightly lower than at ground level it is hypothesized that first floor levels in the area are likely to be less than the 40µg/m<sup>3</sup> AQO, although there does not exist a tool for assessing this more accurately. As such the site is in compliance for the 1 hour objective and marginal for the annual mean at first floor. There are no plans to move the tube to a higher level as there is no access to this façade to make it practicable to change on a regular basis.

Trent House Flats (THF) site is on the façade of an upper storey residential flat and is representative of residential exposure on the façade. However, the tube location is subject to higher winds than normal and is in an exposed area. This site has been doubled up in November 2009 as levels are consistently close to or marginally above the annual mean AQO and the doubling should improve the accuracy of any results for the site. The 2009 result is 43.3µg/m<sup>3</sup> which is an increase on the previous year (38.6µg/m<sup>3</sup>). It is unknown what the effect of the exposed position is on the site results, however, the increased air flow is likely to over estimate results at this site. The site this year is above the AQO for the annual mean but below the 1 hour surrogate value.

Wilford Lane 3 (WL3) is new for 2009 and replaced a tube across the junction at roadside which had no relevant receptor nearby. This tube is mounted on a lamppost and is on the side of the junction where relevant receptors for the annual mean are present, albeit they are set back from the road. Utilising the distance correction tool available from <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls> to estimate the exposure at the nearest receptor a corrected value of 37.4µg/m<sup>3</sup> is estimated at the nearest receptor at this site. The background value selected is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B. This is below the AQO and as such the site is not breaching the AQO for the annual hourly objectives.

TBLA and TBLB (Trent Boulevard A & B) are on the front and rear of a property close to the Lady Bay junction on the A52 junction with Radcliffe Road. Both tubes are there to assess the impact from the A52 traffic at this junction and have been in place for a number of years now with last year seeing a reduction in both such that they were compliant. In 2009 the TBLB site has seen an increase to just above the AQO to 40.3µg/m<sup>3</sup> from 38µg/m<sup>3</sup> last year. The tube is on a façade with no further correction necessary.

Following a planning enquiry about the potential development of a site in the AQMA 1 on Radcliffe Road a tube was placed for a period of time opposite the site junction to enable a more informed decision to be made should a planning application be submitted. This temporary site is referred to as Roam (Acorn) and is a road side site. The nearest relevant receptor would be the Acorn Hotel on Radcliffe Road although residential houses are on the building line along this road length equal distance from the road as the Acorn Hotel. The tube averaged 41.2µg/m<sup>3</sup> at the monitoring point. The adjusted exposure at the nearest receptor was 35.1µg/m<sup>3</sup> utilising the distance correction tool at <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls>. The background value is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B.

This site is therefore in compliance with the AQO and suggests that that inbound traffic lane on the Radcliffe Road is less of a concern than the out bound lane, with levels further away from the traffic stream on the out bound lane being subject to higher pollution levels. (See results for MC and RR)

In 2009 the tube ER (Edward Road) was established to replace a tube in the central crossing location of the junction at Lady Bay. This new site now better reflects relevant exposure and is situated along the building line at this junction. For 2009 the site has shown an average of  $34.5\mu\text{g}/\text{m}^3$  indicating the properties adjacent to the A52 at this junction are below the AQO.

All other sites in AQMA 1 are below the AQO for the annual mean without any fall off with distance correction being applied.

The MC tube is not in the AQMA 1 but does boarder the edge of the AQMA on Radcliffe Road a discussion on this site and the changes that have been made is in subsequent text below. (See non AQMA sites)

### **Diffusion tubes in AQMA 2**

Within AQMA2 (the A52 Ring Road) the NK (Nottingham Knight ) site continues to be high at roadside. However this site does not have any relevant receptors nearby for the annual mean at this point around the island. In a direct line back from the island the public house has an outside seating area that is used in the summer months. As the tube is closer to the road than the seating area by several metres and the site is averaging  $49\mu\text{g}/\text{m}^3$  in 2009 Rushcliffe can state the site is compliant with the AQO. As the site has been in place for a number of years it is proposed to keep the site active to enable roadside trends at this junction to be monitored.

Windy Ways (WW) has seen a reduction in exposure in 2009 such that it now has fallen below the annual mean AQO. The tube is mounted on the façade of a residential property although the property is not currently occupied. A planning application for this site has been commented on by the E&WMS to prevent development taking place at this location which would bring the dwelling closer to the A52 Island. This has become a planning condition on the property. As the site has produced an annual mean of  $38.8\mu\text{g}/\text{m}^3$  and continues a downward trend Rushcliffe can state the site is compliant with the AQO.

The A52WB (A52 Botany Close) tube was mounted on the kerbside of the A52 and always attained a high reading being close to the traffic flow. The tube did not represent relevant exposure to any AQO and in the USA 2009 it was recommended to move this tube to a receptor location on Botany Close. The tube, over 2009, produced an average of  $58.6\mu\text{g}/\text{m}^3$  as such this indicated the 1 hour objective was not being exceeded at residential receptors on Botany Close which are some 15 metres from the A52 Road kerbside. In 2009 the tube was removed and new site established on 3 Botany Close on the façade nearest the A52 road. The 3BT (3 Botany Close) has for the 2 months of exposure averaged  $36.5\mu\text{g}/\text{m}^3$  and is insufficient to annualise to produce any firm conclusion about the site. Monitoring at this site will continue in 2010 and be reported in subsequent R&A reports.

The Cloverland (CL) site is located on the closest property to the A52 along this length of the road and backs onto the 3BT site; the tubes are on the façade and considered to be a relevant receptor for the annual mean with no corrections required. In Nov 2009 the tube site was increased from 1 tube to 2 tubes to improve the accuracy of the results at this site due to the site being close to or above the AQO in recent years. In 2009 the average of the tubes at the site indicated the location was in compliance with the AQO achieving an average of  $38.5\mu\text{g}/\text{m}^3$ .

A second tube site was established in 2009 in the hammer head of the Cloverlands Close, mounted on a lamp post. This was to establish if the past exceedences in the close extended further into the close. The CL2 site produced an average over 8 months of  $29.5\mu\text{g}/\text{m}^3$  well below the AQO. As such the tube was moved to double up at the CL site.

Within AQMA 2 all other sites are in compliance with the AQO's.

Given that the above sites are also considered to comply when taking into account the fall off with distance and the type of exposure being experienced, Rushcliffe can state that **in AQMA 2 all sites were compliant in 2009.**

### **Diffusion tubes not in AQMA's**

The A453 Thrumpton site is located on the grass verge of the A453 and as such is expected to be high ( $44.2\mu\text{g}/\text{m}^3$  for 2009). The site has relevant receptors some distance from the location (23.8m) and as such there is a fall off with distance which leads the site to be compliant with the AQO. The adjusted exposure at the nearest receptor was  $31.6\mu\text{g}/\text{m}^3$  utilising the distance correction tool at <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls>. The background value is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B

In previous years the receptor location has been monitored and found to be consistently low and monitoring has therefore ceased at the receptor in Thrumpton. The A453 tube has fallen now for the third year in a row and does not give any further concern in this area. The tube shall remain in place to enable trends to continue to be monitored.

The East Bridgford site is located on the façade of the dwelling and was relocated on the property due to the effects of a domestic boiler which contributed to a high reading in previous R&A rounds. This has moved the monitoring position away from the road boundary a few metres due to the house being positioned on the plot at an angle to the road. To allow for this and to represent worse case exposure at the site a correction should be applied to the site results of  $27.4\mu\text{g}/\text{m}^3$ . This increases the assessment value to be compared to the AQO to  $28.6\mu\text{g}/\text{m}^3$  which is still compliant with the AQO. The correction is calculated by utilising the distance correction tool at <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls>. The background value is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B.

The MC (Midlands Communications) site is located on Radcliffe Road and mounted on the façade of a shop that protrudes approximately a metre closer to the road than the building line of the flats above. The front of the shops is used as a car park for

visitors and staff and also no relevant receptors exist at ground level. As such the site was recommended to be moved to a higher location in the previous R&A report (USA 2009) and to a residential façade if possible. This was done in November 2009 and is named 37RR. The MC results for the 10 month period is  $40.6\mu\text{g}/\text{m}^3$  the same as the previous year. The adjusted exposure at the nearest receptor was  $39.9\mu\text{g}/\text{m}^3$  utilising the distance correction tool at <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls>. The background value is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B. As such the site is below the AQO. The new 37RR should provide a better assessment in future R&A reports of this area.

Site 37RR (37 Radcliffe Road) has been established from Nov 2009 and has averaged  $35.2\mu\text{g}/\text{m}^3$  for the 2 months exposure in 2009. In order to achieve the height of the tube to assess the actual exposure of residential units on the first floor the tube has been mounted on the closet point to the main road on a fire escape type walk way between two buildings that accesses one of the flats. This has meant the tube is located back from the façade by 3.3 metres. As such a correction to the 2 month average utilising the distance correction tool at <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls> results in a facade level of  $36.8\mu\text{g}/\text{m}^3$ . The background value is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B. Given that the MC tube and the 37RR are assessing the same position a weighted average can be used to further estimate the site exposure.

$$39.9 \times 10/12 + 36.8 \times 2/12 = 39.3 \mu\text{g}/\text{m}^3.$$

Using the method set out in box 3.2 of TG(09) the calculated façade level can be multiplied by the adjustment factor of 0.827 which results in an annualised value of  $30.5 \mu\text{g}/\text{m}^3$  this appears to underestimate the levels at the façade but does not indicate it is any higher than the previously calculated result.

As such the site remains below the AQO.

Holme House (A52HH) is situated on the A52 trunk road into Nottingham and is positioned on the corner of the junction with Stragglethorpe Road. A single tube was mounted on the lamppost near to the lights on the A52 and few metres from the house façade. This was a new site for 2009. This has results over a 10 month period of  $61.6\mu\text{g}/\text{m}^3$ . Utilising the distance correction tool at <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls> results at the facade are predicted to be  $53.5\mu\text{g}/\text{m}^3$ . The background value is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B. This value is significantly above the annual mean and as such Rushcliffe decided to proceed to a detailed assessment of the site.

From November 2009 3 tubes were placed on the façade of the property facing the A52 and a further tube placed on the façade facing Stragglethorpe Road. The result of the 3 tubes on the façade (A52HHF1,2,3) covering a 2 month period is  $51.3\mu\text{g}/\text{m}^3$ . To annualise this the A52HH and AH52HHF1,2,3 façade levels can be averaged

$$53.5 \times 10/12 + 51.3 \times 2/12 = 53.13 \mu\text{g}/\text{m}^3$$

The Stragglethorpe Road tube results for the 2 month period at the end of 2009 indicates this is below the AQO but not enough results have been received yet to annualise this site correctly. Utilising the method proposed in box 3.2 of TG(09) has resulted in under estimates for other sites. However if the results for the 2 months is multiplied by the calculated factor a result of  $30 \mu\text{g}/\text{m}^3$  is achieved. Monitoring of this side of the property will continue and form part of the DA in 2010.

**The façade monitoring confirms the NO<sub>2</sub> annual mean is being exceeded and a detailed assessment will be undertaken for the site.**

The A52RT (the A52 Radcliffe on Trent) is a roadside diffusion tube site and as such is expected to be high. For 2009 the tube average is  $39.1 \mu\text{g}/\text{m}^3$ , a fall on previous years. The tube location is 3.3 metres from the kerb and a further 5.2 metres to the nearest receptor (building line). Utilising the distance correction tool at <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls> results at the facade are predicted to be  $34.8 \mu\text{g}/\text{m}^3$ . The background value is the 2009 value for the Hampton Road Site. The calculation is available in Appendix B. As such this site is compliant with the AQO.

All other locations which are non AQMA sites are below the AQO.

### 2.3.2 PM<sub>10</sub>

There is currently continuous monitoring of particles (PM<sub>10</sub>) undertaken by Rushcliffe Borough Council at one location in the area, the Centenary House, Loughborough Road site. The site has remained the same as for previous rounds of the R&S process. The site is within the AQMA1 area for nitrogen dioxide exceedences and is located close to relevant receptors and close to the building line. The junction is a busy junction in the AQMA and represents exposure in the area. The monitor is a Sven Leckel Gravimetric monitor that is EU equivalent and therefore the data does not require any further adjustment factors applying. Table 2.6 below shows the annual mean concentrations for the site and Table 2.7 shows the number of exceedences of the daily AQO.

**Table 2.6 Results of PM<sub>10</sub> Automatic Monitoring: Comparison with Annual Mean Objective**

Site ID	Location	Within AQMA?	Data Capture for monitoring period <sup>a</sup> %	Data Capture for full calendar year 2009 <sup>b</sup> %	Annual mean concentrations (µg/m <sup>3</sup> )		
					2007 <sup>c, d</sup>	2008 <sup>c, d</sup>	2009 <sup>c</sup>
pm10	Centenary House, Loughborough Road, West Bridgford	Yes	90.4	90.4	20.0	20.2	16.6

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

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

<sup>c</sup> Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

<sup>d</sup> Annual mean concentrations for previous years are optional.



**Table 2.7 Results of PM<sub>10</sub> Automatic Monitoring: Comparison with 24-hour Mean Objective**

Site ID	Location	Within AQMA?	Data Capture for monitoring period <sup>a</sup> %	Data Capture 2009 <sup>b</sup> %	Number of Exceedences of daily mean objective (50 µg/m <sup>3</sup> ) If data capture < 90%, include the 90 <sup>th</sup> percentile of daily means in brackets.		
					2007 <sup>c</sup>	2008 <sup>c</sup>	2009 <sup>c</sup>
PM10	Centenary House, Loughborough Road, West Bridgford	yes	90.4	90.4	9	16	6

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

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

<sup>c</sup> Numbers of exceedences for previous years are optional.

Results of continuous PM<sub>10</sub> monitoring suggest that both the PM<sub>10</sub> AQS objectives were met in Rushcliffe Borough Council's AQMA in 2009 with levels being below the annual limit of 40µg/m<sup>3</sup> and the number of daily exceedences for the 50 µg/m<sup>3</sup> limit not exceeding the 35 allowable number of days. Because the data capture is greater than 90% the 90<sup>th</sup> percentile has not been calculated.

**2.3.3 Sulphur Dioxide**

No monitoring has taken place for Sulphur Dioxide in 2009.

**2.3.4 Benzene**

No Monitoring has taken place for Benzene in 2009

**2.3.5 Other pollutants monitored**

No monitoring has taken place for other pollutants in 2009

### 2.3.6 Summary of Compliance with AQS Objectives

Rushcliffe Borough Council has measured concentrations of nitrogen dioxide above the annual mean objective at relevant locations outside of the AQMA , and **will need to proceed to a Detailed Assessment**, for the area around the junction of the A52 and Stragglethorpe Road, Radcliffe on Trent, Nottinghamshire

Levels in AQMA 2 have all been assessed as being in compliance in 2009.

Levels in AQMA 1 have indicated a number of sites are below the objectives but notable sites such as the THF and TBLB are above the annual mean still with the THF site experiencing an increase in 2009. The area around the Trent Bridge Inn and generally at roadside is high but not exceeding the surrogate 1 hour level of  $60\mu\text{g}/\text{m}^3$  currently.

The pm10 monitoring indicates compliance with the AQO for this pollutant, the same as for previous years.

The NO2 monitor has shown 3 consecutive years now of a downward trends along the Loughborough Road in AQMA1 and indicates compliance to the annual mean and 1hour AQO along this road length.

The main areas of concern for NO2 in the existing AQMA's surround the Trent Bridge/Radcliffe road Junction, the out bound Radcliffe Road and the Lady Bay Junction.

## 3 New Local Developments

### 3.1 Road Traffic Sources

Rushcliffe Borough Council has identified one road in the borough for which major improvements are currently being undertaken.

This is the A46, for which construction work widening to dual-lanes begun in 2009. The scheme has been subject to an air quality assessment as part of a full EIA and public enquiry which concluded that the widening of the A46 would not result in any exceedences of the AQS objectives. The road is still under construction and not open to traffic in 2009. An extract from the reports states that *“We have calculated concentrations of the main road traffic pollutants with and without the Scheme at a selection of residential properties along the existing A46, the new alignment and surrounding side roads. Baseline and operational pollution levels at all the selected residential properties are below the current air quality objectives, EU and limit values. Overall, the Scheme would have a moderate beneficial impact on community exposure to road traffic pollution.”*

*When the Scheme is fully open in 2016, 84% of properties within 200m of the road would experience an improvement in air quality and 16% would experience a worsening in air quality. The air quality impact assessment concludes that the Scheme would not result in any significant air quality problems due to changes in road traffic emissions. The assessment uses a worst case scenario.”*

There is no requirement to proceed to a Detailed Assessment for this road scheme but Rushcliffe will review the impact on air quality of this road once the road is fully opened. The air quality assessment can be viewed at <http://www.highways.gov.uk/roads/projects/4406.aspx>

Rushcliffe Borough Council has reviewed the traffic flows on major roads, B roads and C roads in the district. A table showing the full data set can be seen in Appendix F. Rushcliffe can confirm that no significant increases in traffic have occurred since the last review and assessment.

A list of roads under construction in the borough is contained in Appendix E. All of these roads are linked to housing schemes and have been subject to review at the planning stage. None of the roads are expected to have significant traffic flows.

### **3.2 Other Transport Sources**

Rushcliffe Borough Council confirms that there are no new 'other transport sources' since the last updating and screening assessment in their local authority area meeting the specified criteria.

### **3.3 Industrial Sources**

Rushcliffe Borough Council confirms that there are no new industrial sources since the last updating and screening assessment in their local authority area meeting the specified criteria.

### **3.4 Commercial and Domestic Sources**

Rushcliffe are aware of an application proceeding under the county planning system and the Environmental Permitting Regulations 2010 with the EA as a Part A1 3MW process for a biomass energy plant which will be located at John Brooke Sawmill, near to Widmerpool adjacent to the A46. An air quality assessment is in the process of being undertaken by Oaktree Environmental, although an initial screening assessment s has already been undertaken in previous R&A rounds. This site will require further consideration once operational but currently this is still at the planning stage.

The County Council has provided a list of schools in the Rushcliffe area which are proposed to move to biomass wood pellets, the list is shown in Table 3.1 and Table 3.2 below. Most of these will replace coal or oil boilers in existing locations and should lead to reduced emissions in particularly where they are replacing coal powered boilers. Rushcliffe has received an application for a chimney height approval for the new biomass boiler at Rushcliffe school which has been approved and reported on the USA 2009.

Rushcliffe Borough Council confirms that there are no areas of significant domestic fuel use in their local authority area.

Table 3.1 proposed/completed biomass plants in schools in Rushcliffe

Site	Installed Capacity	Replacing	Type	Pellet Used p.a. (Tonnes)	CO2 savings (tonnes)	Project Status (completed)	Location
James Peacock Infant & Nursery School	150	Coal Boiler	Converted coal boiler	10.00	14.40	Completed 2004	Rushcliffe
The West Bridgford School	2200	Coal Boiler	Converted coal boiler	369.00	531.36	Completed 2006	Rushcliffe
Lady Bay Primary School	100	Coal Boiler	New pellet Boiler	50.64	72.92	Apr-09	Rushcliffe
Brookside Primary School	220	Coal Boiler	New pellet Boiler	22.60	32.54	Jul-09	Rushcliffe
Rushcliffe Comprehensive	900	Oil Boiler	New pellet Boiler	260.50	325.10	Jul-09	Rushcliffe
Abbey Road Primary School	220	Coal Boiler	New pellet Boiler	38.21	55.03	Sep-09	Rushcliffe
West Bridgford CHUB	150	Replace Existing site	New pellet Boiler	61.27	55.88	Oct-10	Rushcliffe

Table 3.2 additional list

Site	District	Street	Area 1	Area 2	Postcode	Annual Heat Load	kW h	Boiler Type	Fuel Type	Tonnes Pellet / Year	CO2 saving compared to gas	CO2 saving compared to current fuel
Orston Primary	Rushcliffe	Church Street	Orston	Orston	NG13 9NS	56,824	120	Pellet Boiler	Stemwood & Chemically untreated wood residues	13.93	15.61	22.05
James Peacock Infants School	Rushcliffe	Manor Park	Ruddington	Nottingham	NG11 6DS	121,891	180	Pellet Boiler	Stemwood & Chemically untreated wood residues	29.88	33.48	47.29

### **3.5 New Developments with Fugitive or Uncontrolled Sources**

The construction element of the A46 is being undertaken through 2009 and will be continuing into 2010 and beyond. The current phase is at ground works phase. The construction and operation phases have been the subject of air quality assessments at the consultation phase with the public enquiry considering impacts to the environment and local residents. Dust control and other mitigation measures have been implemented by the construction company undertaking the work for the Highways Agency. Rushcliffe confirms that there are no other 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

Rushcliffe Borough Council have adopted a regional Air Quality Strategy, this is available via the council's website at <http://www.rushcliffe.gov.uk/upload/public/attachments/248/Breathoffreshairfornotts.pdf>.

This strategy has been prepared by a partnership of Nottinghamshire Local Authorities, the Environment Agency, The Health Protection Agency and the Highways Agency. The work has been led by the Nottinghamshire Environmental Protection Working Group. This framework identifies and agrees an effective strategy to improve air quality in the next decade throughout the whole of Nottinghamshire and also reduce greenhouse gas emissions particularly CO<sub>2</sub>. The strategy is entitled 'A breath of fresh air for Nottinghamshire, An Air Quality Improvement strategy for the next Decade' and will be launched on April 25<sup>th</sup> 2008.

The Framework for Action seeks to fulfil the following main objectives:

- Minimise air pollution and the impact of global warming and climate change.
- Encourage sustainable development in Nottinghamshire to protect the health and wellbeing of the population.
- To work with businesses, stakeholders and the residents of Nottinghamshire to encourage sustainable improvements in air quality.
- Support and maintain the work of the Nottinghamshire Air Quality Steering Group.
- Complement other county wide groups and strategies adopted and supported by Local Authorities and the County Council and other organisations such as the Environment Agency, Primary Care Trusts, Highways Agency and the Health Protection Agency.
- Ensure that the strategy to improve air quality in Nottinghamshire is reviewed by 2011.

The Council is a member of the Nottinghamshire Environmental Protection Working Group (NEPWG) formed in partnership with Nottinghamshire County Council, Ashfield District Council, Bassetlaw District Council, Broxtowe Borough Council, Gedling Borough Council, Mansfield District Council, Newark and Sherwood District Council Nottingham City Council, Environment Agency, Health Protection Agency and the Highways Agency.

The NEPWG works under the direction of the Nottinghamshire Chief Environmental Health Officers Group. The NEPWG enables the authorities to work collaboratively on the full range of pollution issues, demonstrating that liaison on a technical level is already well established.

The Nottinghamshire Air Quality Steering Group was formed in 1998 and comprises representatives from each local authority, Health Protection Agency, Highways Agency, Nottinghamshire County Council University of Nottingham and the power generators. The group acts as a consultation body to advise local authorities of procedures, to ensure wide consultation in relation to air quality issues, and in particular air quality reviews and assessments.



## 5 Planning Applications

The planning application approved in 2009 are shown below in Table 5.1 below.

Table 5.1 significant planning applications approved in 2009

<b>Housing sites</b>				
Planning ref	Site name	No. of dwellings	Other	
08/01703/FUL	Land Rear Of 2 - 8 Hoe View Road Cropwell Bishop Nottinghamshire	12 houses		
08/01731/FUL	Stanford Hall Melton Road Stanford On Soar Nottinghamshire LE12 5QW	118 flats; 10 houses	70 rooms (residential institutions); 1080sqm B1; 719sqm A1; 314 sqm A2	
09/00601/REM	Land North West Of Gotham Road East Leake Nottinghamshire	154 houses		
09/01204/FUL	Five Minute Car Wash Pavilion Road Nottingham NG2 5FP	9 flats	2 retail units	
<b>Employment sites</b>				
Planning ref	Site name	Proposal	Area	Floorspace
08/02054/FUL	1a Mabel Grove West Bridgford Nottinghamshire NG2 5GT	Construction of three storey office/retail building with access and parking following demolition of existing building	0.07	B1a: 260; B8: 190
09/00524/REM	Land to the west of Chapel Lane (phase 1), Bingham	Development of land for B1 offices	2.13	B1: 4400sqm
09/01119/FUL	Land At Rear Of 7 - 9 Radcliffe Road West Bridgford Nottinghamshire	Construct first floor offices, second floor storage, with undercroft car parking	0.03	B1: 200sqm
08/00653/OUT	Tollerton Airport Tollerton Lane Tollerton Nottinghamshire NG12 4GA	Redevelopment for up to 28,600 sq.m of B1 enterprise park; airport control tower with ancillary facilities, dining and meeting rooms; energy centre; associated access, parking, landscaping and infrastructure works; off site highway improvements	8.1	B1: 28600sqm
09/01169/FUL	Manor Farm Kneeton Road East Bridgford Nottinghamshire NG13 8PJ	Construction of two storey office block, East Bridgford	1.26	B1: 106sqm
08/02054	Mabel Grove, West Bridgford.	Construction of 3 storey office building with retail.	0.07	B8: 190sqm; A1: 156sqm

Those sites highlighted in red above are within the AQMA areas and air quality assessments and mitigation measures were undertaken as part of the planning process.

Rushcliffe Borough council has received a number of applications for larger developments which have been ongoing over 2009 (or received in 2009). Below is a summary of the sites with further discussion. In many cases the sites are in proposed on areas where new built properties should not experience any poor air quality above the AQO, however, these sites may contribute cumulatively to increase commuter traffic which is the cause of the exceedences in existing AQMA, consequently they are of interest and where possible mitigation measures have been discussed.

**Land at Sharphill To East And West Of Melton Road Edwalton Nottinghamshire**

Proposal: Mixed use development of up to 1200 dwellings; primary school; business innovation centre; further education centre; 100 bed hotel; local centre with retail units, community building and health centre, sports facilities and community park; associated road

Decision: **Refused**

Appeal status: **Allowed**

Application number: 08/00664/OUT Melton Road, Edwalton (Sharphill)

This is a site of about 107 hectares to the south of Edwalton, to the east and west of the A606 Melton Road. It would be primarily residential, comprising of about 1,200 houses but including provision for a new school, associated commercial uses and employment development. The developers, Bovis Homes and David Wilson Homes (North Midlands), are also proposing to designate some land around Sharphill as a 'community park'.

Notice of refusal of planning permission - updated 23 July 2008.

Appeal Decision

In February 2009, a Public Inquiry was held into the Council's decision to refuse outline planning permission. The Inspector submitted his report to the Secretary of State, who, on 6 July 2009, accepted his recommendation that planning permission be granted subject to conditions.

The Secretary of State acknowledged that the development is inappropriate, and by definition harmful, in the green belt. However, he concluded that the harm to the green belt is clearly outweighed by the urgent need for land for housing, including affordable housing, in advance of the Core Strategy, and noted other benefits of the proposal. He considered that the proposals would otherwise accord with most development plan policies and did not consider that it would be premature in relation to the emerging Core Strategy.

The decision is subject to a 'Section 106' legal agreement, requiring the provision of affordable housing and other infrastructure improvements and there are 27 conditions, including the preparation of a detailed Master Plan.

The developers will need to submit further detailed application(s) for 'Reserved Matters' approval, and the Inspector imposed a condition requiring development to commence within two years in order to start fulfilling housing need in the Borough.

The original application and appeal documents, Inspector's report and Secretary of State's decision can be found on Rushcliffe's web site under the original application reference 08/00664/OUT.

As part of the application the Environment and Waste Management Service reviewed an air quality assessment and entered into discussions with the developer about the air quality impacts that may result. The Environment and Waste Management Service eventually agreed that the air quality impacts would not be sufficiently detrimental to form part of the objection and withdrew the initial objection. As part of the application process the developer has agreed to a range of mitigation measures to reduce the impacts of transport emissions and climate change impacts. The development of the site will result in a long term building programme in the area with various stages of development being undertaken over a number of years. The development has not yet begun and at this time there is no need to undertake any further assessment of the site.

### **Nottingham Gateway (South Of Clifton) Land Southeast & Northwest Of A453 Green Street Barton In Fabis Nottinghamshire**

Proposal: Outline application comprising residential development up to 5,500 dwellings; employment uses of mixed B1, B2 and B8 on up to 30 hectares; retail development (Classes A1 - A5); leisure use; community buildings; extension to Nottingham Express Transit with

Decision: Pending

Application number: 09/01025/OU

The applicant has agreed to a further extension of the formal determination period until early 2010. We are aware of further work being undertaken on the Transport Assessment and discussions are ongoing in relation to a number of other technical matters. These discussions are being undertaken without prejudice to the final decision of the Borough Council.

The applicant has indicated that it is their intention to finalise any changes to the proposal and to submit additional supporting documentation by the end of February 2010. Upon receipt of these revisions and the additional information, consultation and publicity will be undertaken with statutory and interested parties, including public consultation and a formal period for receipt of written responses. An air quality assessment has been submitted as part of the EIA which has been commented on by the Environment and Waste Management Service as not demonstrating sufficiently that the site will not impact on air quality in the district, in particular the AQMA areas. The application is not decided at this stage and further information is expected in due course. The site has also been identified in the LDF as a growth point however the LDF has not been formerly adopted at this stage.

### **Nottingham (Tollerton) Airport**

This relates to an area of about 7.7 hectares, currently consisting of hangar buildings, hard standing, etc. The proposal is to redevelop the site as a business park, including up to 28,600 sqm of B1 (Office/Research and development) buildings and a new airport control tower.

Outline planning permission was granted on 20 November 2009, subject to a number of conditions and a 'Section 106' legal agreement, requiring off-site highway improvement works.

**Cotgrave colliery development**

This would be a mixed employment and retail scheme of up to 500 houses on the former Cotgrave colliery site. The developers, East Midlands Development Agency and English Partnerships, held an exhibition and consultation event in Cotgrave on 22 November 2007.

Planning permission was been **refused** on 14 January 2009. The decision notice can be viewed on Rushcliffe's website under reference number 08/00567/OUT.

The development proposal was for 470 - 500 dwellings; employment uses (B1, B2 and B8); combined heat and power generating plant; primary school; open space; landscaping and associated works including roads, cycle ways, footpaths and car parking. As the site is a brown field site the Environment and Waste Management Service expect some form of development of this site in the future.

**RAF Newton.**

RAF Newton was the subject of considerable speculation in 2009 being nominated as a proposed Eco town. This has now been halted however the site being a brown field site and already having some abandoned housing present has been the subject of further development proposals. In 2007 outline permission was given for Mixed use scheme including use of Hangars 1, 3 and 5 for B8 use; demolition of former Officers accommodation and construction of 165 dwellings with community facility, access and open space (revised proposals). In early 2010 a further application has been received for further housing and business use. The site is situated outside of the main urban areas and development should not result in AQO being exceeded.

**A453 dualing**

The A453 is currently under proposals to dual the carriage way from the M1 to the A52. The scheme has still not been finalised or approved although draft orders have been published. In 2009 a public enquiry has taken place which concluded in November 2009. The results of the enquiry are not known at this time. An EIA including an air Quality Assessment has been produced as part of the enquiry process by the consultants working for the Highways Agency. A summary of the results of the assessment can be found in Appendix G

**Windy Wayes.**

This property is a single property situated adjacent to the Nottingham Knight Island. In 2009 an application was received which would see the house develop closer to the traffic flow around the Island. This would result in a worsening of the air quality at the site it being already in an AQMA. As such the Environment and Waste Management Service successfully objected to the proposal and agreed a revised scheme that would not see any residential part of the dwelling being moved closer to the traffic flow.

**Land South of Wilford Lane, West Bridgford**, Residential development and open space and related infrastructure. 287 Houses, 5.7 Ha. Outline permission is being sort in 2009.

## 6 Air Quality Planning Policies

Rushcliffe Borough Council currently has no local planning policies dedicated solely to air quality; Policy G1 of the Rushcliffe Borough Non-Statutory Local Plan does cover issues in relation to pollution. Above this, planning decisions where air quality is a consideration are informed by national policy in PPG13 and PPG23 in particular, and at a regional level by Policy 36 of the East Midlands Regional Plan. Since its adoption in March 2009, the Regional Plan forms part of the Borough's statutory development plan.

In accordance with Policy 36 of the Regional Plan, it is intended that the Council's Local Development Framework (LDF) will, in time, set out new policies that contribute to reducing air pollution. In particular, a Supplementary Planning Document relating to air quality is likely to be prepared. However, work on it cannot be undertaken until the main elements of the LDF, specifically the LDF's Core Strategy, have been progressed further. At present, it is envisaged it will be around 2 years before the SPD can be completed.

In the interim the Environment & Waste Management Service have produced a non-statutory advice guide for developers with regards to air quality and the undertaking of air quality assessments which can be accessed from Rushcliffe's Website at <http://www.rushcliffe.gov.uk/doc.asp?cat=9441&doc=10663>

## 7 Local Transport Plans and Strategies

Nottinghamshire County Council, in partnership with Nottingham City Council has produced the Local Transport Plan and the main function of the Plan is to set out the local transport strategy and priority areas for investment over a five year period.

The plan area includes Rushcliffe, the City of Nottingham, and the neighbouring boroughs of Broxtowe, Gedling, and part of Ashfield. The objectives of the plan are based on the Governments "Shared Priority for Transport" as well as three locally determined objectives. The three relevant themes for the Plan are managing congestion and improving air pollution and improving quality of life.

The LTP Objectives are:

- A. To increase sustainable accessibility to the City Centre and district centres in ways which enhance economic activity, encourage development in and reduce social exclusion from these centres,
- B. To reduce traffic growth and to encourage modal change away from the private car particularly for work journeys to the City Centre,**
- C. To encourage safe walking and cycling for short journeys including travel to schools, shops and other local facilities
- D. To improve integration and interchange between modes
- E. To integrate land-use and transport planning by ensuring all new major development is well connected to the public transport system and accessible by foot / cycle,
- F. To maintain and enhance Greater Nottingham's accessibility to regional, national and international markets, particularly by modes other than the car
- G. To reduce social exclusion and to improve the accessibility to transport for disadvantaged groups, particularly disabled people
- H. To relieve communities from the adverse effects of through traffic, particularly heavy goods vehicles,**
- I. To maximise the efficiency and maintain the structural integrity of existing transport networks,
- J. To increase transport choice in rural areas,
- K. To improve air quality within the Plan area and to alleviate other transport impacts upon health, and**
- L. To improve road safety, particularly for vulnerable road users.

Road transport is the major source of pollution in Rushcliffe and the Greater Nottingham Local Transport Plan (LTP) has played an important role in working towards improving air quality, and the main focus of the air quality action plan has been linked around the measures in the LTP to reduce transport emissions in AQMA 1 and 2.

Rushcliffe Council regularly meets with the Local Transport Plan Manager at the Nottinghamshire County Council to discuss the progress of the measures set out in

the AQAP. The aim of the meeting is to move forward the key objectives set out in the action plan looking at such matters as improving traffic flows, park and ride systems, bus priority routes, improvements to public transport and considering air quality impacts from major developments. The meetings enable this authority to link into the LTP and influence transport planning to improve air quality with in the Borough that may be directly outside of its control. A target has been set to meet with the LTP on three occasions annually.

The Local Transport Plan for Greater Nottingham 2006 – 2011 can be viewed or downloaded from

[http://www.nottinghamshire.gov.uk/home/traffic\\_and\\_travel/strategy-policy/ltp.htm](http://www.nottinghamshire.gov.uk/home/traffic_and_travel/strategy-policy/ltp.htm)

The existing Local Transport Plans expires on 31 March 2011 and the NCC transport planners are currently developing the replacement; the third Local Transport Plan. (LTP3)

The third Local Transport Plan will cover the whole of the county and will run from 1 April 2011. The NCC is currently deciding what should be Nottinghamshire's transport priorities and a consultation process is ongoing

## 8 Climate Change Strategies

Climate Change - A climate change strategy and action plan is in development, supported by the EST and based on their preparatory questionnaires. The strategy and action plan will be adopted in 2010, with implementation over the following years. See <http://www.rushcliffe.gov.uk/doc.asp?cat=11138> for further information.

Local Strategic Partnership - The environmental action plan is being updated and will include specific actions on climate change; these are likely to concentrate on green travel and sustainable food issues. The LSP has supported the development of a green streets initiative (encouraging green travel) in the West Bridgford area. A role out of the "Greening Campaign" to parishes and neighbourhoods across Rushcliffe, encouraging communities to take first steps to reduce their impact, has been carried out with 10 communities so far signed up



## 9 Implementation of Action Plans

The air quality action plan was drawn up to outline what actions can be taken by Rushcliffe BC and other partner organisations to work toward reducing nitrogen dioxide levels within the declared AQMA's to below the National Air Quality Objectives at relevant receptor locations. The main measures of the action plan are to:

- provide information and awareness
- consideration of alternative means of transport
- road network management
- management of emissions
- planning considerations

Within Rushcliffe and for most Local Authorities road transport is the major source of NO<sub>2</sub> and is the underlying cause of the declaration of AQMA's.

The LTP sets out the local transport strategy and priority areas for investment over a five year period and includes the City of Nottingham, the boroughs of Broxtowe, Gedling, Rushcliffe and part of Ashfield. The integration of the Action Plan with the Greater Nottingham Local Transport Plan (LTP) was and will continue to be the main focus of this action plan and will revolve around

- measures to reduce congestion,
- Promotion of alternatives to car travel and
- General reduction measures to reduce transport emissions.

Regular meetings continue to take place between Rushcliffe BC and the Local Transport Team Manager at the Nottinghamshire County Council in recognition of the main cause of declaring AQMA's being traffic pollution on NCC road network in AQMA 1. The aim being the reduction in traffic flow in the area and therefore a reduction in the emissions within AQMA 1. It has been agreed to schedule three meetings in each year to discuss the progress made with the NCC measures in the AQAP and to provide feedback to the LTP on monitoring data undertaken by Rushcliffe.

Table 9.1 details progress of the measures being implemented by the County Council as well as those planned during 2010/11. Table 9.2 details the indicators used to measure the individual measures; a colour coding scheme is used to easily identify which targets are being met and which are behind schedule. The measures reflect the strategy contained within the Greater Nottingham Local Transport Plan 2006/07-2010/11 and the measures contained within the Congestion Delivery Plan for Greater Nottingham 2006/07-2010/11 (updated November 2009).

Work on the development of the third Local Transport Plan (LTP3), which will replace the existing Plan from 1 April 2011, is underway. The development of LTP3 will consider the integration of the Air Quality Action Plan (AQAP) to help provide a systematic way of joining up air quality management and transport planning. The development of LTP3 will also include a review and assessment of the measures to

be included in the future AQAP and it is anticipated that this review will be completed by the end of July 2010.

It should also be noted that potential reductions in Central Government transport funding beyond March 2011 could seriously impact on the delivery of the future AQAP.

Table 9.3 indicates the measures that have been identified for Rushcliffe to implement and provides an update on the progress made to date and Table 9.4 contains the indicator data for each adopted measure.

Table 9.1 NCC Action Plan Progress

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
<b>Parking</b>	Gamston Park and Ride  Feasibility studies - 2006/07 and 2007/08  Planning permission submission - 2007/08  Anticipated scheme completion - 2010/11	Not due for completion until 2011. No outcome from the scheme will be measurable until at least one year after scheme completion. The County Council has undertaken an Environmental Scoping Assessment and preliminary design works but can not progress the scheme (including the submission of a planning application) and extensive modelling and ongoing negotiations, the Highways Agency concerning access to A52.	The Highways Agency approved access to the A52 in late 2009. However, the length of time taken to grant this approval has meant that <b>funding for the cost of the whole project is not currently available as delivery of the scheme would extend beyond the current funding allocations up to 2010/11</b> . Due to the uncertainty over the levels of funding for local transport (there will almost certainly be cuts in central government funding for local transport and major scheme improvements) beyond 2010/11, the scheme has therefore been postponed. An alternative cheaper option to the scheme is being considered in the form of pilot 'pocket' park and ride schemes to see if they can deliver similar benefits along the A52 corridor for much less cost.	NI167 NI177 LTP2 LTP6 L14
	Civil parking enforcement  Introduce civil parking enforcement - 2007/08	Draft special parking area (SPA) submitted to DfT May 2005. Negotiations between Borough, County, neighbouring authorities and other stakeholders undertaken 2006/07 and concluded during 2007, at which time a formal application for SPA was submitted. Negotiations and agreement between NCC and the seven borough/district councils were concluded in 2007. Civil Parking Enforcement was introduced on 12 May 2008.	Parking surveys across eight towns' commercial areas in the County were undertaken before the introduction of the scheme in 2008 and again in 2009. <b>These surveys have shown that illegal parking on weekdays has fallen from 45% in 2008 before introduction of the scheme to 31% in 2009 after its introduction; and from 43% in 2008 to 32% in 2009 on weekends.</b>	NI167 LTP2 LTP6 L14
<b>Smarter Choices</b>	NCC travel plan  1996 and ongoing	The NCC travel plan has been in operation for the past 10 years and has been incorporated into the climate change action plan for the County Council.  In 2007 NCC employees based at campuses in West Bridgford travelled to work by the following means - 9% cycled; 13% walked; 14% by public transport; and 10% car share. These figures are much better than the mode of travel to work for all people in Nottinghamshire detailed in the 2001 census (3% cycled; 10% walked; 12% by public transport).	Whilst new NI185 does not require the County Council to report on commuter travel the Council intends to continue monitoring the mode split of travel to work bi-annually. 2009 is the first year of reporting on NI185 and has therefore taken priority for resource allocation (which has been significant due to setting up the new reporting systems). Consequently, whilst it was planned to undertake staff travel surveys bi-annually, a staff travel survey was not undertaken in 2009 due to the limited resources.  A variety of measures have been undertaken to promote alternatives to the car, including involvement in 'walk week', 'bike week', personalised travel planning etc.	NI167 NI175 NI176 NI177 LTP2 LTP3 LTP6 L3 L14
	Investigate staff car park charging and its implications  Investigation to be completed by 2007/08	A car park focus group has been established for NCC staff to ensure equality of any implications. A decision on any 'on-site' charging regime has been delayed, however, due to an impending change in Chief Executive in 2008. Staff car park charging has been introduced for NCC employees at 'off-site' nearby previously free parking facilities.	Charging at 'off-site' car parks introduced April 2008. <b>There has been a significant reduction in the numbers of observed vehicles parking in the car parks</b> but there is no evidence to demonstrate that this parking has not just been displaced on-street.  It is proposed that there will be a review of car parking arrangements at specific County Council sites.	NI167 LTP2 LTP6 L14
	Undertake measures to deliver 1% per year increase in cycle mode share	All of the work undertaken by the NCC travel plan co-ordinator (eg, publicity campaigns, personalised travel planning etc.) aim to deliver increases in cycle mode share.	Whilst new NI185 does not require the County Council to report on commuter travel the Council intends to monitor cycling levels at the County Council as part of the Carbon Management Plan. 2009 is the first year of reporting on NI185 and has therefore taken priority for	NI167 NI175 NI176 LTP2

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
	2007/08 and ongoing	The NCC Carbon Management Plan was approved in April 2007 and new baseline data was gathered in July 2007 (7% of all NCC employees currently cycling to work).	resource allocation (which has been significant due to setting up the new reporting systems). Consequently, whilst it was planned to undertake staff travel surveys bi-annually, a staff travel survey was not undertaken in 2009 due to the limited resources.  In the county part of Greater Nottingham there has been a <b>10% increase in cycling between 2005 and 2009 with a 7% increase between 2008 and 2009.</b>	LTP3 LTP6 L14
	Undertake measures to deliver 1% per year reduction in business mileage  2007/08 and ongoing	Various measures are underway to help deliver the reductions in business mileage including new terms and conditions which affect business mileage rates and driver training to help motorists drive more sustainably.  The NCC Carbon Management Plan was approved in April 2007. Whilst new NI185 does not require the County Council to report on commuter travel the Council intends to monitor business mileage at the County Council as part of the Carbon Management Plan.	The baseline data was collected during 2008/09 and targets of 2% reduction have been set for 2009/10. 2009/10 data is not yet available. Targets have been determined for the overall CO <sub>2</sub> emissions from vehicles and plant used on County Council business. This indicator can be broken down further and the 2008/09 baseline data is included below in brackets: <ul style="list-style-type: none"> <li>CO<sub>2</sub> emissions from business kms (3,515t)</li> <li>CO<sub>2</sub> emissions from County Council fleet vehicles, plant and outsourced provision (5,472t)</li> </ul> Baseline data has also been calculated for NO <sub>x</sub> from the County Council's fleet and reduction targets will be set for 2010/11 (30,738kg - 2008/09 baseline).  Across Greater Nottingham the area wide road traffic mileage has <b>reduced by 3% between 2003 and 2008.</b>	NI167 NI175 NI176 NI177 LTP2 LTP3 LTP6 L14
	RBC travel plan		See RBC progress table	NI167 NI175 NI176 NI177 LTP2 LTP3 LTP6 L3 L14
	Workplace travel plans  Develop workplace travel plans with businesses in the vicinity of the AQMA - 2006/07 and ongoing  Develop plans with Environment Agency and Nottingham Forest Football Club - 2007/08	Nottingham Forest has developed an approved travel plan which covers not only its employees but also supporters. Match day smarter choices promotion has been undertaken and discussions are now underway on hard measures to support the travel plan.  29 workplace travel plans have been developed in Rushcliffe Borough.	<b>A further two travel plans have been developed in Rushcliffe Borough during 2009/10 with another three in development.</b>	NI167 NI175 NI176 NI177 LTP2 LTP3 LTP6 L3 L14
	School travel plans  Develop school travel plans	All schools within West Bridgford have been contacted. NCC's school travel plan officers are currently working with 12 of the 13 schools in West Bridgford.	<b>Approved travel plans have been developed at 12 of the 13 schools in West Bridgford.</b>	NI167 NI175 NI176

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
	with schools in West Bridgford - 2001 and ongoing  Contact the remaining schools concerning the development of a travel plan - 2007/08		In 2008/09 23% of secondary and primary aged pupils travelled to school by car (3% below its target of 26%).	NI177 NI198 LTP2 LTP3 LTP6 L4 L14
	Marketing campaigns  Investment in the 'Big Wheel' which markets public transport as well as the benefits of walking and cycling - 2003/04 and ongoing	NCC has committed to a funding contribution to the 'Big Wheel' and a service level agreement between the two parties is in place for the period 2007/08. 'Big Wheel' has undertaken various marketing campaigns throughout the year including 'Stan's Plan', which is a lay person's guide to the local transport plan.	Cycling numbers within the county part of Greater Nottingham area have increased by 10% between 2005 and 2009 (with 7% increase between 2008 and 2009).  Public transport patronage in Greater Nottingham has increased year on year since 2004/05. Further increases of 2% were seen in public transport patronage in Greater Nottingham between 2007/08 and 2008/09.  Smarter choices marketing campaigns have been undertaken during 2009/10 at all of the major sporting venues which could impact on the AQMA (Nottinghamshire County Cricket Club, Nottingham Forest Football Club and Nottingham Rugby Club) at matches during the 2009/10 seasons.	NI167 NI175 NI176 NI177 NI198 LTP2 LTP3 LTP6 L3 L4 L14
	Car clubs  Investigate the introduction/ promotion of car sharing schemes at NCC - 2007/08	nottinghamshare.com was launched in April 2006.	The number of registered users on the website has increased from 1,500 to 1,895. A total of 359 NCC staff and 1 RBC staff are registered on the website. NCC staff have made estimated savings of 223,543miles; 73.6kg of CO <sub>2</sub> ; 110kg nitrogen oxides; 10kg particulate matter as a result of car sharing through the website.	NI167 LTP2 LTP6 L14
	Car sharing  Investigate the feasibility of the introduction of car share club at County Hall - 2007/08  Establishment of Greater Nottingham Car Club - 2008/09	A feasibility study was undertaken by consultants on the merits of introducing such a scheme. The study concluded that the greatest benefits would be seen by a scheme evolving out of the car share club introduced in the City.  A feasibility study was undertaken on the merits of introducing such a scheme. The City Council are currently in discussions with service providers.	No outcome from the scheme will be measurable until at least one year after scheme completion.	
	Personalised travel planning  A pilot 'travel smart' scheme was undertaken in the Meadows and Lady Bay areas adjoining the AQMA in 2003/04, a further travel smart scheme is due to be undertaken - 2008/09		Due to staff resource issues this measure was not undertaken in 2009/10 and will be reviewed later during this financial year as part of the development of the third Local Transport Plan.	
<b>Planning</b>	Development control	Co-ordination of land use planning and transport infrastructure through the Local Development Framework	Work continues on the development of the Local Development Frameworks. An Aligned Core Strategy involving all of the district	

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
			councils in the Core Nottingham Housing Market Area is being developed.	
	<p>Development control contributions</p> <p>Use of collected development control contributions to provide cycling, walking and public transport improvements within the AQMA - 2007/08 and ongoing</p>	<p>At the end of 2007, RBC had collected sums in excess of almost £800K through this process.</p> <p>Two new posts have been created within the County Council improve the s106 process and consistency with the districts.</p>	<p>Recent schemes which have utilised this funding and will help provide benefits across the AQMA include part funding Ruddington bus service improvements (contribution of £30K s106 funding); Clifton Road/Wilford Lane cycle route (contribution of £280K s106 funding); Electronic car park space signing in West Bridgford (contribution of £30K funding).</p> <p>Electronic bus time table displays are also due to be installed shortly (contribution of £47K funding).</p>	<p>NI167 NI175 NI176 NI177 NI198 LTP2 LTP3 LTP6 L3 L4 L7 L14</p>
<b>Walking</b>	<p>Develop walking map for West Bridgford employees</p> <p>Develop walking map for West Bridgford employees - 2006/07</p>	<p>A walking map was developed and distributed to employees in West Bridgford. The map was launched to coincide with 2007 Walk Week.</p> <p>8,500 maps have been distributed in the West Bridgford area (2,500 to employees at the three largest employers; 2,500 to libraries; and 3,500 to households in the area.</p>	The maps remain available on-line to download and in local libraries.	<p>NI167 NI175 NI176 NI198 LTP2 LTP6 L3 L4 L14</p>
	<p>Greater Nottingham walk week and walk to work day</p> <p>Involvement and promotion of Greater Nottingham walk week and walk to work day - 2006/07 and ongoing</p>	Involvement in Walk Week during May 2009 included guided walks, a chance to try out activities.	In addition to the walking events that are held throughout the year, a number of events were held during walk week included: urban Nordic walking; an evening Nordic starlight trek; 'Pushy Mothers' for mums to exercise with their buggies; a celebration event in the Market Square to promote health; and walk to work events. Walk week also coincided with national walk to school week which was promoted by the County Council in all schools across the county. It is hoped that the events in Walk Week will encourage people to continue walking and lead healthier lifestyles.	<p>NI167 NI175 NI176 NI198 LTP2 LTP6 L14</p>
<b>Cycling</b>	<p>Cycle maps of Greater Nottingham area</p> <p>Develop and distribute cycle maps of Greater Nottingham area - 1999 and ongoing</p>	Maps continue to be distributed throughout the county, and are available as a hard copy and on-line.	Cycling numbers within the county part of Greater Nottingham area have increased by 10% between 2005 and 2009 (with 7% increase between 2008 and 2009).	<p>NI167 NI175 NI176 NI177 NI198 LTP2 LTP3 LTP6 L3 L4 L14</p>
	Cycle training	The County Council offers nationally accredited cycle training to people of all ages and abilities.	Cycle training continues to be offered free of charge to children in the county. Adult training is also available free to members of the public,	<p>NI167 NI175</p>

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
	Deliver adult and child cycle training - Ongoing		whilst training is offered at workplaces at a cost to employers. 12 additional trainers were trained to accredited standards in 2008 to meet the national guidelines.	NI176 NI198 LTP2 LTP3 LTP6 L3 L4 L14
	Advance cycle stop lines  Advance cycle stop lines introduced at all feasible junctions within the AQMA - 2006/07	Advance cycle stop lines have been installed at all feasible major signal junctions within the AQMA.	This action has been completed.	NI167 NI175 NI176 NI198 LTP2 LTP3 LTP6 L14
	Wilford Lane cycle route  Wilford Lane cycle route to be installed - 2007/08	A 330m off-road 3m wide shared-use cycle route was installed on Wilford Lane during 2007/08.	Cycling figures from the cycling counter will not be available until May 2009.	NI167 NI175 NI176 NI198 LTP2 LTP3 LTP6 L3 L4 L7 L14
	Lady Bay Bridge cycle lane  To be implemented as part of Eastside Regeneration scheme - 2010/11	This scheme is not due for implementation until 2010/11.	The measure is not due to commence yet and therefore there is no progress or outcomes to report.	
<b>Public transport</b>	SkyLink bus service  Introduction of SkyLink direct 24 hour bus service to the airport - 2004/05 and ongoing	The service began operating in May 2004 and in February 2006, the Skylink service became 24-hour, operating every 30minutes and was re-routed via Trent Bridge.	Since beginning of this service in May 2004 the service has seen passenger figures increase over 100% year on year. In 2007 over 350,000 passengers used the service.	NI167 NI175 NI176 NI177 LTP2 LTP6 L14
	Ticketing  Introduction of ITSO smartcard ticketing - 2007/08	It was planned to introduce ITSO smartcards in replacement of the NCC legacy concessions smartcard in March/April 2007 and this was carried out in the Bassetlaw District. When government announced the introduction of the English National Concessions Scheme (ENCTS) commencing 1st April 2008 it was decided, however, that, rather than carrying out two complete card re-issues, the ITSO and ENCTS cards would be introduced together.	130,000 concessions cards (including 21,000 in Rushcliffe) were produced and distributed to pass holders during 2008.	NI167 NI175 NI176 NI177 NI178 LTP2 LTP6

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
		Scholars' cards were issued in ITSO format starting July 2007.		L7 L8 L14
	Concessionary fare schemes for the over 60s and disabled  Free countywide off-peak concessionary fare schemes for the over 60s and disabled to be introduced - 2006/07	A free countywide off-peak concessionary fare scheme for the over 60s and disabled was introduced on 1 April 2006.	In 2008/09 over 99% of those eligible aged over 60 in Greater Nottingham had taken up a concessionary fare pass (an increase of 14% from 2007/08).	NI167 NI175 NI176 NI177 NI178 LTP2 LTP6 L7 L8 L14
	Concessionary fares for young people  Consideration of introduction of concessionary fares for young people - 2010/11	A pathfinder bid to progress the introduction of concessionary fares for young people at an earlier date than planned was submitted to Government in December 2007. The pathfinder bid was unsuccessful which means that the consideration of introduction of such a scheme will remain as 2010/11.	The measure is not due to commence yet and therefore there is no progress or outcomes to report.	
	Information  Investigate and publicise web based journey planners - 2006/07	Nottinghamshire is now part of the national, multi-modal Traveline journey planner. Web links to the Traveline site are publicised and available from the County Council's website. In addition to this, links to all of the area's public transport operators' journey planner information are also available from NCC's website.	This action has been completed. Links to the Traveline journey planner and operators' journey planner information continue to be available are available from NCC's website.	NI167 NI175 NI176 NI177 NI198 LTP2 LTP6 L3 L4 L7 L14
	Public transport infrastructure  Install/ replace flagpoles/ timetable cases along key AQMA corridors - 2006/07	Flagpoles and timetable cases have been installed/replaced along the key AQMA corridors.	This action has been completed.	NI167 NI175 NI176 NI177 NI178 NI198 LTP2 LTP6 L3 L4 L7 L14
	Construction of the East Midlands Parkway station on the A453 with adjoining park and ride site	Construction started at the site in December 2007.	Parkway station opened in January 2009. Usage continues to grow and approximately 4,000 passengers are using the station each week.	NI167 NI175 NI176 LTP2



Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
	Scheme completion - 2008/09			LTP6 L14
	Bus priority on the A60  Further bus lane priority will be considered on the A60	A 0.4km bus lane has been installed on the A60 in both directions south of Trent Bridge. Improvements to the 'bus gate' signals on the southerly approach are being considered to improve bus priority.	The further improvements have not been implemented yet and therefore there is no progress or outcomes to report.	NI167 NI175 NI176 NI177 NI178 NI198 LTP2 LTP6 L3 L4 L6 L7 L14
	Encourage operators to take-up cleaner vehicles through partnership working  Cleaner fleet vehicles - 2010/11	Operators are encouraged to take-up cleaner vehicles through partnership working. Due to the sustained high level of investment by the two main operators the average age of the bus fleet operating in the AQMA is already less than six years old and by the end of 2007 all of the two main operators fleet were low-emission Euro2, 3 or 4 standards.	Partnerships with all of the major bus operators are ongoing including the establishment of a new transport development group which is held every two months. The group will help determine future service and public transport scheme improvements.	
	Capacity increases on the GO2 services along the A60 corridor  Capacity increases on the GO2 services along the A60 corridor to be implemented - 2008/09		A £230K scheme has been implemented to deliver Ruddington bus service enhancements which travel along the A60.	NI167 NI175 NI176 NI177 NI178 NI198 LTP2 LTP6 L3 L4 L6 L7 L14
	Install 'real time' bus information along key AQMA corridors - 2010/11		The measure is not due to commence yet and therefore there is no progress or outcomes to report.	
<b>Cleaner vehicles</b>	Develop and implement an action plan to improve NCC's fleet  2010/11		The measure is not due to commence yet and therefore there is no progress or outcomes to report.	
	Introduce increasing proportion of bio-fuels to NCC's fleet		The measure is not due to commence yet and therefore there is no progress or outcomes to report.	

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
	2008/09 and ongoing			
<b>Network management</b>	Traffic control and information  Jointly fund the traffic control centre that monitors traffic movement and provides real time traffic control over many traffic signal installations - Ongoing	The County and City Councils jointly fund the traffic control centre that monitors traffic movement and provides real time traffic control over many traffic signal installations. Real time information is conveyed onto the local media and disseminated via NCC's web site. A review of the Travelwise Centre was undertaken in early 2007 which resulted in a complete restructuring of Travelwise in May 2007. The review included how the traffic and travel information is conveyed to the public, taking into account advances in communication systems, the internet, mobile phones, satellite navigation and radio broadcasting. The existing Travelwise web site was completely rebuilt and developed to become the central real time information hub for reporting road conditions, congestion, road works, events, incidents, travel information and useful advice for the travelling public.	The Travelwise centre remains in operation 24hrs a day, every day.	NI167 NI175 NI176 NI177 NI178 NI198 LTP2 LTP3 LTP6 L3 L4 L6 L7 L14
	Introduction of SCOOT/MOVA  SCOOT/MOVA - Ongoing  Introduction of MOVA at junction of Radcliffe Road/ Ambleside - 2006/07	SCOOT/MOVA and other traffic signal efficiency improvements, including CCTV at junctions within AQMA.  MOVA was installed at the junction of Radcliffe Road/Ambleside during 2007/08.	This action is complete.	NI167 LTP2 LTP5 LTP6 L6 L14
	Co-ordination of streetworks - Effective co-ordination of streetworks to minimise traffic disruption and unnecessary congestion as part of NCC's network management duty  County Council's network management duty - Ongoing	Systems for notice management and coordination have been upgraded to enhance noticing handling, monitoring of works proposals, coordination of works and directing timing of works. Staff awareness and training has been undertaken to ensure that powers are used effectively. Promoters of highway works have been made aware of the requirement to manage works to minimise the impact on traffic to reduce disruption. A review of street designations and network hierarchy has commenced to improve data quality for works promoters and network managers and to prioritise works management. Regular coordination meetings have been held between all works promoters in conjunction with the City Council and HA and also additional regular meetings between the HA and the local authorities of Nottinghamshire, Nottingham, Derbyshire and Derby to create a composite framework programme of planned works affecting major routes in the region. In addition, workshops have been held with major works promoters including utility companies to promote good practice and to encourage alternative working methods with a review to reducing peak period working and thereby address the most disruptive aspect of working on the highway.	Detailed journey time monitoring of key corridors (including the A60, A6011 and A6520 which lie within the AQMA) has been undertaken in 2007 as part of the Greater Nottingham Congestion Delivery Plan and Road User Charging feasibility study. This data will be used as a baseline to monitor congestion through journey times in future years.  The average journey time per mile has not increased since 2005 and Nottinghamshire County and Nottingham City Councils remain on track to meet their national congestion target.  Between 2007 and 2008 there were no significant increases in journey times along the monitored routes in the AQMA. Data for 2009 is not yet available.	NI167 NI175 NI176 NI177 NI178 NI198 LTP2 LTP3 LTP6 L3 L4 L6 L7 L14
	Incident management - Effective management of	As indicated under Traffic Control and Information, the joint County/City control centre and travelwise web site have been	Detailed journey time monitoring of key corridors (including the A60, A6011 and A6520 which lie within the AQMA) has been undertaken in	NI167 NI175

Intervention	Measure/ timescales	Progress with measure	Progress since last review	Related targets
	<p>incidents to minimise traffic disruption and unnecessary congestion as part of NCC's network management duty</p> <p>County Council's network management duty - Ongoing</p>	<p>comprehensively revised. This has improved the manner in which incident information can be dealt with to ensure that communication about the incident is passed effectively to those who need to deal with the matter and also to the road user. The local operating agreement between the authority and the HA has been comprehensively reviewed to identify the relevant parts of the network which have interaction on each authority and to put in place appropriate communication channels for management of incident information.</p>	<p>2007 as part of the Greater Nottingham Congestion Delivery Plan and Road User Charging feasibility study. This data will be used as a baseline to monitor congestion through journey times in future years.</p> <p>The average journey time per mile has not increased since 2005 and Nottinghamshire County and Nottingham City Councils remain on track to meet their national congestion target.</p> <p>Between 2007 and 2008 there were no significant increases in journey times along the monitored routes in the AQMA. Data for 2009 is not yet available.</p>	<p>NI176 NI177 NI178 NI198 LTP2 LTP3 LTP6 L3 L4 L6 L7 L14</p>
	<p>Contingency planning - Effective contingency planning to minimise traffic disruption and unnecessary congestion as part of NCC's network management duty</p> <p>County Council's network management duty - Ongoing</p>	<p>Working in close collaboration with the City and HA, tactical diversion routes have been developed for the emergency diversion of traffic from any part of the trunk road network, to reduce the delay in implementation of alternative routes and to ease congestion at the time of incidents. Key locations on the local network are being identified and associated diversion routes investigated in line with the developing network hierarchy.</p>	<p>Detailed journey time monitoring of key corridors (including the A60, A6011 and A6520 which lie within the AQMA) has been undertaken in 2007 as part of the Greater Nottingham Congestion Delivery Plan and Road User Charging feasibility study. This data will be used as a baseline to monitor congestion through journey times in future years.</p> <p>The average journey time per mile has not increased since 2005 and Nottinghamshire County and Nottingham City Councils remain on track to meet their national congestion target.</p> <p>Between 2007 and 2008 there were no significant increases in journey times along the monitored routes in the AQMA. Data for 2009 is not yet available.</p>	<p>NI167 NI178 LTP2 LTP6 L6 L14</p>
	<p>Highway direction signing</p> <p>To be upgraded to improve accessibility, safety and make best use of existing networks - 2010/11</p>		<p>The measure is not due to commence yet and therefore there is no progress or outcomes to report.</p>	
	<p>ParkSmart directional signing</p> <p>Introduce interactive ParkSmart directional signing to zones within the City - 2010/11</p>		<p>This measure was introduced in 2009/10.</p>	<p>NI167 LTP2 LTP6 LTP8 L14</p>

<b>Major schemes</b>	A52 ring road upgrade	A business case has been submitted to DfT by the City Council but no decision has been made on its success or progression.	The Regional Funding Allocations (RFA) were reviewed and priorities were submitted to DfT in February 2009. The A52 Ring Road upgrade was included in the priorities with funding allocated for a scheme start date of 2011.
	NET phase 2 - timescales subject to all feasibility, funding and approvals	Department for Transport granted 'programme entry approval' for Phase 2 of the Nottingham Express Transit (NET) in October 2006. This decision has allowed progress of the extension of the tram system to incorporate two new lines to the south and west of Nottingham city centre totalling 17km in length. A public inquiry into the proposals closed on 16 January 2008.	The Inspector presented his findings on the NET Public Inquiry to the Secretary of State for Transport whom approved the Transport and Works Act Order (TWAO) for the NET Phase 2 proposals on 30 March 2009. Preparatory costs for the introduction of the two new lines were allocated funding through the second round of Regional Funding Allocations in February 2009. Construction could start in 2010 with trams running on the extended NET system by 2013.
	A453 widening	The first Regional Funding Allocation (RFA) in January 2006 identified the A453 widening as a medium priority but the February 2009 RFA review made the scheme a high priority. The proposed scheme aims to improve the A453 trunk road between the M1 junction 24 and the A52 in Nottingham, to ease existing highway congestion and improve road safety.	The Highways Agency has published draft legal Orders and an Environmental Statement, which is part of the Statutory process for delivering this scheme. Following public exhibitions and consultation on the proposals a Public Inquiry was held in November 2009. The findings of the Inquiry have been passed to the Secretary of State and their decision is still pending. Subject to a favourable decision by the Secretary of State (and thereby confirmation of the draft Orders) as well as funding approvals, the start of works is proposed Autumn/Winter 2010/11 with the road open to traffic in Winter 2012/Spring 2013.
	A46 duelling	The first Regional Funding Allocation in January 2006 allocated funding for only a quarter of the scheme which was due to be built by 2019. During the recent Regional Funding Allocation review (RFA2), Government, as part of its response to the national economic situation, offered additional funding to the Region to pay 50% (£174m) of the cost of the A46 scheme to facilitate a start to be made in 2009/10 as a single phase construction with completion in 2011/12. Although the offer meant that the Region would need to fund the remaining 50% of the scheme costs from the RFA2 budget, it provides the only affordable means for the Region to secure the A46 improvement at the earliest opportunity and avoids the need to phase construction over a lengthy period.	The Region's financial commitment to the A46 has now been brought forward and it will now be possible to deliver the full scheme within three years. The main construction contract commenced in June 2009 and the construction is currently slightly ahead of the original schedule with the A46 road improvement due to be completed in Spring 2012.  A supplementary Orders Public Inquiry was held in January/February 2010. The findings of the Inquiry have been passed to the Secretary of State and their decision is still pending. This Inquiry will not delay the on-going construction of the remainder of the scheme.
	New River Trent crossing	The AQMA encompasses two of the three road bridges crossing the River Trent within the Greater Nottingham LTP area. A fourth road bridge crossing is not planned until after the 'dualling' of the A52 between Clifton Bridge and Saxondale island, including grade separated junctions between these two locations. The work on the A52 does not, however, feature as a regional priority for the period up to 2020.	The new River Trent Crossing was not considered a regional priority for the period up to 2013/14. Priorities beyond this date will be considered at a later date but it is unlikely they will be made earlier than late 2011 to ensure that they deliver the regional priorities determined as part of the development of the Delivering a Sustainable Transport System for the East Midlands.
	Road user charging	The Three Cities Partnership which includes Derbyshire, Leicestershire and Nottinghamshire County Councils and the respective City Councils and other regional partners received Government pump priming funding as part of the second round of the Transport Innovation Fund programme. The funding was allocated to the partnership for an in-depth investigation into the possible options for tackling congestion problems and improving roads and public transport across the sub-region. The funds were used to consider the potential for road pricing schemes and other transport options to reduce congestion and support economic growth over the next 15 years.	The feasibility study was completed in the spring of 2008. At that point, the six local authorities considered all of the evidence collected. For further investigations on a potential road user charging scheme to progress all of the partners needed to approve. Some of the six authorities did not, however, wish to proceed with further investigations at this time.

		The effectiveness of the alternative options in tackling congestion was assessed primarily through transport models. These models were developed and validated and the outputs considered alongside other key issues such as estimates of implementation costs and initial views from a programme of key stakeholder engagement.	
	Workplace parking levy - timescales subject to all feasibility, funding and approvals	The public consultation on the proposals for a Workplace Parking Levy (WPL) in Nottingham closed on 12 October 2007 following a 12 week consultation period. As part of the consultation there was a five day Public Examination of the WPL proposals by an independent chairman. An independent report of the findings, together with responses from the consultation, was presented to Nottingham City Council in December 2007. Councillors considered the conclusions of the public consultation and the Public Examination of the WPL proposals at the Nottingham City Council's Executive Board on 18 December 2007 and decided to proceed, in principle, with developing the details of the scheme.	The scheme was ratified by Nottingham City Full Council in May 2008, and a revised Business Case was subsequently submitted to the Department for Transport (DfT). DfT granted conditional approval for the scheme in July 2009 along with confirmation of the Orders. No charge will be applied to employers until April 2012 but the scheme will be introduced (subject to further feasibility, funding and approvals) without charge, six months prior in October 2011.

**Table 9.2 Nottinghamshire County Council Indicator Table**

Progress against Trajectory Legend:																
Going strongly in the right direction																
No clear trend/slowly going in the right direction, perhaps not fast enough to meet agreed targets																
Going in wrong direction																
Definitions	Year Type	Units	Plan Area		Year	Value			Actual and Trajectory Data						Progress	
									2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		
NI 167 Congestion - average journey time per mile during the morning peak	Academic	Minutes and Seconds	Joint Plan Area	Base Data	2005/06	3.8 mins	Actual Figures		3.8 mins	3.9mins	3.8 mins	3.8mins				
				Target Data	2010/11	4.2mins	Trajectory		3.8mins	3.9mins	4.0mins	4.0mins	4.1mins	4.2mins		
NI 175 Access to services and facilities by public transport, walking and cycling	Financial	Percentage	County	Base Data	2005/06	96.00%	Actual Figures		96.00%	96.00%	96.00%	96.00%				
				Target Data	2010/11	96.00%	Trajectory		96.00%	96.00%	96.00%	96.00%	96.00%	96.00%		
NI 176 Working age people with access to employment by public transport (and other specified modes)	Financial	Percentage	County	Base Data	2007/08	83.00%	Actual Figures		N/A	N/A	87.00%	80.35%				
				Target Data	2010/11	85.00%	Trajectory		N/A	N/A	83.00%	83.00%	84.00%	85.00%		
NI 177 Local bus and light rail passenger journeys originating in the authority area	Financial	Number	County	Base Data	2005/06	34,028,525	Actual Figures		32,559,000	34,028,525	35,135,170	35,436,400				
				Target Data	2010/11	35,410,218	Trajectory		N/A	34,028,525	34,368,810	34,712,498	35,059,622	#####		
NI 178 Bus services running on time	% of non-frequent services on time	Financial	Percentage	County	Base Data	2006	84%	Actual Figures		N/A	84.00%	82.00%	83.00%			
					Target Data	2010	86%	Trajectory		N/A	84.00%	85.00%	86.00%	87.00%	88.00%	
	Financial	Minutes	County	Base Data	2006	0.67 mins	Actual Figures		N/A	0.67	0.67	0.77				
				Target Data	2010	1 mins	Trajectory		N/A	1	1	1	1	1		
NI 198 Children travelling to school (split by the mode of travel usually used)	Primary schools	Financial	Percentage	County	Base Data	2006/07	35.99%	Actual Figures		N/A	35.99%	35.90%	34.61%			
					Target Data	2010/11	33.72%	Trajectory		N/A	35.99%	35.42%	34.85%	34.28%	33.72%	
	percentage of which Car (including vans and taxis)							Actual Figures		N/A	35.99%	35.90%	34.61%			
	percentage of which Car Share							Actual Figures		N/A	2.79%	3.00%	3.17%			
	percentage of which Public Transport							Actual Figures		N/A	3.42%	3.10%	3.19%			

percentage of which Walking								Actual Figures			N/A	56.71%	57.20%	57.89%			
percentage of which Cycling								Actual Figures			N/A	1.01%	0.80%	0.79%			
percentage of which Other								Actual Figures			N/A	0.80%	0.00%	0.35%			
Secondary schools	Financial	Percentage	County	Base Data	2006/07	13.65%	Actual Figures			N/A	13.65%	12.20%	14.08%				
				Target Data	2010/11	11.38%	Trajectory			N/A	13.65%	13.08%	12.51%	11.94%	11.38%		
percentage of which Car (including vans and taxis)								Actual Figures			N/A	13.65%	12.10%	14.08%			
percentage of which Car Share								Actual Figures			N/A	0.96%	1.10%	1.16%			
percentage of which Public Transport								Actual Figures			N/A	26.83%	29.40%	28.38%			
percentage of which Walking								Actual Figures			N/A	55.53%	54.00%	52.23%			
percentage of which Cycling								Actual Figures			N/A	2.92%	2.80%	2.96%			
percentage of which Other								Actual Figures			N/A	0.12%	0.60%	1.20%			
LTP2 - Change in area wide road traffic mileage	Calendar	Million Vehicle Kilometres per annum	Joint Plan Area	Base Data	2004	2,933	Actual Figures	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		
				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)	Calendar	Index based on 2003 = 100	Joint Plan Area	Base Data	2003	100	Actual Figures	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		
				Target Data	2010	107	Trajectory	100	101	102	103	104	105	106	107		
LTP6 - Changes in peak period traffic flows to urban centres	Calendar	Number of vehicles	Joint Plan Area	Base Data	2003	34,590	Actual Figures	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11		
				Target Data	2010	34,590	Trajectory	34,590	34,590	34,590	34,590	34,590	34,590	34,590	34,590		
L3: Commuter travel plans	% of employees covered by a commuter travel plan	Calendar	Percentage	Joint Plan Area	Base Data	2005	15%	Actual Figures	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	
					Target Data	2010	20%	Trajectory	N/A	N/A	15%	22%	36%	36%			
L4: School travel plans	% of schools with an approved travel plan	Financial	Percentage	County	Base Data	2004/5	15%	Actual Figures	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	
					Target Data												

					Target Data	2010/11	80%	Trajectory	N/A	15%	26%	37%	47%	58%	69%	80%																																				
L7: Accessibility of healthcare	% of households within 45 minutes of hospital by bus or tram	Calendar	Percentage	Joint Plan Area	Base Data	2006	87%	Actual Figures	N/A	N/A	N/A	87%	89%	89%																																						
					Target Data	2010	90%	Trajectory	N/A	N/A	N/A	87%	87%	88%	89%	90%																																				
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					Target Data	2010/11	80%	Trajectory	N/A	15%	26%	37%	47%	58%	69%	80%																																				
									2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11																																				
L8: Accessibility for the elderly	% of eligible population taking up concessionary fares entitlements	Financial	Percentage	County	Base Data	2004/05	62%	Actual Figures	N/A	N/A	46%	74%	73%	81%																																						
					Target Data	2010/11	70%	Trajectory	N/A	N/A	46%	48%	51%	53%	55%	57%																																				
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					Target Data	2010/11	80%	Trajectory	N/A	15%	26%	37%	47%	58%	69%	80%																																				
									2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11																																				
L14: Carbon dioxide emissions	Volume of carbon dioxide emitted by vehicles in Greater Nottingham	Calendar	Tonnes	Joint Plan Area	Base Data	2004	248,000	Actual Figures	N/A	248,000	247,000	248,000	248,000	239,000																																						
					Target Data	2010	269,000	Trajectory	N/A	248,000	251,500	255,000	258,500	262,000	265,500	269,000																																				
					<table border="1"> <thead> <tr> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Target Data</th> <th>2010/11</th> <th>80%</th> <th>Trajectory</th> <th>N/A</th> <th>15%</th> <th>26%</th> <th>37%</th> <th>47%</th> <th>58%</th> <th>69%</th> <th>80%</th> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2003/04</td> <td>2004/05</td> <td>2005/06</td> <td>2006/07</td> <td>2007/08</td> <td>2008/09</td> <td>2009/10</td> <td>2010/11</td> <td></td> </tr> </tbody> </table>																						Target Data	2010/11	80%	Trajectory	N/A	15%	26%	37%	47%	58%	69%	80%											2003/04	2004/05	2005/06	2006/07
					Target Data	2010/11	80%	Trajectory	N/A	15%	26%	37%	47%	58%	69%	80%																																				
									2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11																																				



Table 9.3 Rushcliffe Borough Council Measures

measure	Focus	responsibility	Air Quality Impact	Time scale	Indicator	Progress
RBC Travel Plan	Reduce impact of RBCs business and staff travel.	P Philips	L	M	Implementation of travel plan.	2009: RBC Travel Plan - <b>No progress has been made on the update for the RBC Travel Plan and there is no timescale for this work.</b> A review is currently underway by the Senior Management Team for the Lease Car Scheme, this will consider environmental measures in the consideration of any changes.
Nottinghamshire Air Quality Strategy	Review the strategy through the Nottinghamshire Air Quality Steering Group	E&WMS (M Hickey)	L	n/a	Adoption of strategy	Strategy was adopted in 2008 Strategy was adopted by RBC in 2008. NFA required. <b>COMPLETED IN 2008</b>
Remote home working	Expand to other Service areas as appropriate		L	S	AQ3	2009:Environmental Health staff currently undertake a significant proportion of work from home negating the need to travel through the AQMA areas. This measure has been adopted in 2009 as the 'fit for purpose review' with the potential to increase remote working where appropriate throughout the Council.
Energy efficiency	Reduce emissions of greenhouse gases and nitrogen dioxide from RBC premises and domestic premises and establish targets	P Philips (Sheila Hood)	L	2009/2010	NI185 NI187	An energy strategy is in place for the period 2000-2010 with the aim of reducing energy usage in general. This measure is now part of the Climate Change Action Group remit  NI 187 Progress – we are feeding our action plan into the county action plan under the LAA. At the moment RBC are continuing with actions from 2008/9. The county NI 187 group have secured money to fund further initiatives into 2011.

Climate change action group	Air quality – % reduction in NOx and primary PM10 emissions through local authority's estate and operations.	P Philips	L	2009/2010	NI 194 NI 185 NI 186	<p><b>2008:</b> Commenced Sept 2008. Steering group set up which meets periodically. Energy Saving Trust questionnaire completed by all departments- action plan developed with targets incorporated to lower Co2 and Pm10. Progress report discussed at group – regular agenda item for future. Contributions made to the Air Quality Action Plan.</p> <p><b>2009:</b> Climate Change - A climate change strategy and action plan is in development, supported by the EST and based on their preparatory questionnaires. The strategy and action plan will be adopted in 2010, with implementation over the following years.</p>	
RBC procurement	Implement a green corporate procurement strategy to reduce pollution	Procurement officer (David Hayes)	L	S		<p>The Council published 'Green purchasing guidelines' in Jan 2004. The Council requires pre-qualification of suppliers to ensure that they practice equal opportunities and environmental policies. A procurement strategy is in place covering 2006-2009. Currently RBC is working toward a regional Sustainable Procurement with Improved environmental performance across the range of goods purchased being a key aim.</p> <p><b>2008:</b> No further progress to report</p> <p><b>2009:</b> No further progress to report</p>	
Local Plans. Development Control Strategies.	<p>Develop Supplementary Planning Documents.</p> <p>Ensure air quality is a material consideration for key developments in the Borough.</p> <p>Prevention of a worsening of air quality through inappropriate development in or around the AQMA's</p>	<p>Development control (Richard Mappletoft)</p> <p>E&amp;WMS (M Hickey)</p>	M	<p>2009</p> <p>Ongoing</p> <p>ongoing</p>	<p>Draft has been produced and published on web in 2009</p> <p>AQ4</p> <p>AQ5</p> <p>AQ6</p>	<p>Draft guidance produced.</p> <p>Planners have policy in place to refer applications with air quality impacts</p>	<p>Air quality is a material consideration in planning matters and specific conditions relating to land use and traffic impacts are being commented on and attached as planning conditions currently. A draft informal SPD has been drafted by EH&amp;WM but requires further revision prior to consultation. An un adopted guide for developers is likely to be published this year but formal adoption by development control is yet to be discussed:</p> <p><b>2009:</b> non statutory guide has been produced and published.</p> <p><b>Planners have suggested SPD will be 2012/13 before published</b></p>

Control of industrial emissions	Liaise with Environment Agency to ensure that air quality is considered as part of the IPPC regime/enforcement of ppc controls to air	E&WMS (M Hickey)	L	ongoing	LIEWM20	Incorporated into existing procedures. Measure implemented	
Bonfires	Encourage composting recycling and enforce bonfire controls on demolition sites	E&WMS, neighbourhood (P Scotney)	L	ongoing	AQ2	Policies are already in place to investigate complaints within 5 days	
Smoke control	Enforce the requirements of the Smoke Control Areas In West Bridgford	E&WMS, neighbourhood (P Scotney)	L	ongoing	AQ1	Policies are already in place to investigate complaints within 5 days	
AQ monitoring/information	Continued monitoring throughout the borough. Development of County wide AQ website and develop consistent monitoring procedures. Air quality monitoring data and reports published on Rushcliffe.gov.uk web site	E&WMS (M Hickey)	L	Implemented  Updates in 2009  Annually June July 2009	Web site going live.  Updates to web site design  Published on web	Envitec & Casella employed by AQSG to install	Further training on the use of the software has been undertaken in 2008/09. Further web development needs to take place though the AQSG to further enhance the service. Initial meetings arranged to discuss updates made for July 2009 Web site went live in 2008. RBC real time data is now published on the web for Loughborough Road NO2. Previous data and reports are on RBC website. Meetings have continued in 2009 and further development is expected in 2010 and publicity given to the new site. <b>2009. This measure is now accessible to the public and is completed albeit amendments to the website will take place and new additions as time allows</b>
Local Strategic Partnership	Develop key actions on air quality improvement within the Environmental Issues Group	P Scotney/ P Philips	L	M	NI85 N194	Rushcliffe Community Partnership have developed an Action Plan 'A Better Future for Rushcliffe – Protecting and Improving Our Environment' Key actions with the aim of reducing Rushcliffe's Eco footprint and air quality being one aspect of the action plan. To be implemented over 08/09  <b>2009</b> Local Strategic Partnership - The environmental action plan is being updated and will include specific actions on climate change, these are likely to concentrate on green travel and	

						sustainable food issues. The LSP has supported the development of a green streets initiative (encouraging green travel) in the West Bridgford area. A role out of the "Greening Campaign" to parishes and neighbourhoods across Rushcliffe, encouraging communities to take first steps to reduce their impact, has been carried out with 10 communities so far signed up.
Liaison with the Highways Agency	Develop further actions for the improvement of air quality within the AQMA's	E&WMS(M Hickey / Sarah Cairns)	L	2009/2010	Meet with HA at least annually.  Forward any Air quality reports to the HA as a consultee  Contact the Route manager in 2009 if necessary	<b>2009.</b> The HA have attended one meeting of the AQSG in early 2009 and provided an update on air quality from their perspective to the group as a whole. Regarding RBC the HA are of the opinion that the levels of NO2 along the A52 in AQMA2 are expected to fall below the AQS objectives before projects such as the A453 become live. This is based on an Air Quality assessment undertaken by consultants on their behalf for the A453 widening project. <b>HA are to undertake study in 2009/2010 as indicated in the following measure.</b> <b>Reports are forwarded to the HA annually from Rushcliffe.</b> <b>Sites in AQMA 2 have gone below AQO in 2009 therefore further action with HA not high priority for AQMA2</b> Rushcliffe has liaised with the route manager for the A52 to consult on moving the PM10 to Holme House and the exceedences for NO2 at the site.
A52 Traffic Study	Determine traffic levels and air quality impacts along A52 from Widmerpool to Clifton and associated junctions.	Highways Agency	H	By end of 2010	Production of final report	<b>Study ongoing at this time.</b>
VOSA vehicle emissions testing	Liaise with NCC and evaluate feasibility of enforcement of emission standards within AQMA's	E&WMS (M Hickey)	L	2009/2010	Under take monitoring	The action was raised at the AQSG. 2 LA's agreed to part take in a joint scheme. This was insufficient to fund the project.  Item will remain open but no further progress has been made. <b>2009 no progress</b>

RBC fleet and fuel policy	Use good vehicle management. Evaluate cleaner fuels/vehicles	E&WMS (Robert Yarnall)	L	M	NI194 Review of fuel policy	Fleet operated on bio diesel mix. Currently have 1 Euro V vehicle with 2 more to be delivered in June 08. Older vehicles on 8 year rolling programme of change. Has 1 electric all terrain vehicles for country park. To review fuel policy again in 2009. Driver awareness training in place Progress on fleet composition to be update annually by RBC Fleet Manager 2009. <b>Fleet manager has not provided and update for this measure in time for report publication. No progress to report</b>
LTP integration	Reduction/prevention of traffic increase in AQMA 1 through the LTP	LTP transport Planners (Sean Parks)	H	April 2010  During 2009	Production of indicators and targets for each LTP measure annually  AQ7	LTP table reported in 2008 Met with LTP on 2 occasions in 2008. New table supplied by LTP with targets and indicators added for 2009 see attached table. <b>2009: progress and indicators table produced by LTP . Meetings continuing on target to progress measures and highlight areas for improvements/development</b>
Reduction in NO2 in AQMA's	Measure NO2 concentrations at key receptor locations in AQMA's	E&WMS (M Hickey)	H	ongoing	AQ8 full details of NO2 results reported annually to Defra through R&A	Generally levels increased in 2007. Levels have reduced in 2008 such that a number of key sites are now at or below the annual AQS objectives. <b>2009</b> has seen levels fall again. Noted exceptions are the THF. Predictions using the Defra future year's tool suggest that all sites will be compliant in 2011 if traffic growth does not occur.
Reduction in NO2 in AQMA's	Renew NO2 and PM10 monitors in AQMA 1	E&WMS (M Hickey)	H	April 2010	Implemented in 2009 and Jan 2010	New Romon enclosure and new No2 analyser purchased from Casella through a joint procurement with Nottingham City to reduce costs. A grant toward the monitor was applied for and £1500 received from Defra  PM10, Sven Leckel EU monitor was renewed in 2009 purchased from Eti the current supplier. <b>measure complete</b>

Table 9.4 Rushcliffe BC Air Quality Action Plan indicators

Indicator		2006		2007		2008		2009	
		Target	Actual	Target	Actual	Target	Actual	Target	Actual
N185: Percentage CO2 reduction from LA operations		N/A	N/A	N/A	N/A	N/A	Base line established	5% reduction	*1
N186: Per capita reduction in CO2 emissions in the LA area		N/A	N/A	N/A	N/A	N/A	Base line established	5% reduction	*1
N187: Tackling fuel poverty - % of people receiving income based benefits living in homes with a low and high energy efficiency rating		N/A	N/A	N/A	<u>2007/8 baseline.</u>  SAP below 35 6.32% Sap above 65 33.6	N/A	<u>2008/9 baseline.</u>  SAP below 35 5.53% Sap above 65 40.32%	2009/10  SAP below 35 4.8% SAP above 65 43%	2009/10  SAP below 35 <b>9.22%</b> SAP Above 65 <b>32.26%</b>
N194: Air quality – % reduction in NOx and primary PM10 emissions through local authority's estate and operations		N/A	N/A	N/A	N/A	5%	Base line established	5% reduction	*1
LIEWM20: % of risk based inspections undertaken as part of the annual programme PPC				98%	100%	98%	100%	98%	100%
AQ1: Number of smoke control complaints investigated		N/A	2	N/A	2	N/A	2	n/a	5
AQ2: Number of bonfire complaints investigated		N/A	83	N/A	83	N/A	69	n/a	32
AQ3: Number of RBC staff remote working							25 home workers 21 occasional	increase	23 home workers 17 occasional
AQ4: Air quality assessments reviewed through the planning process	No of Assessments					n/a	6	n/a	4

AQ4 continued		No of properties affected covered by assessments					n/a	Approx 2125 units & 28,400 m2 business park	n/a	09/01025/OUT 5,500 dwellings up to 30 hectares employment  A453 dualing consultation effects 13,304 properties  09/01119/FUL 295m2 office use in AQMA  08/00567/OUT 470-500 dwellings & business use (33.4Ha)
AQ5:	Number of pre application discussions						n/a	4	n/a	3
	Number of applications commented on for air quality						n/a	9	n/a	9
AQ6: Number of Travel plans conditioned through the planning process							n/a	1	n/a	0
AQ7: Number of meetings with LTP							3	2	3	3
AQ7/2: Number of meetings with HA					1	0	1	1	1	1

#### Definitions

**SAP below 35** = % of people receiving income based benefits living on homes with a low energy efficiency rating.

**SAP above 65** = % of people receiving income based benefits living on homes with a high energy efficiency rating.

**\*1 Data for 2008 has been collected to form base line. % reduction has not been calculated at this time**

## Rushcliffe BC Air Quality Action Plan Indicators -continued

Indicator		2006		2007		2008		2009	
		Target	Actual $\mu\text{g}/\text{m}^3$	Target	Actual $\mu\text{g}/\text{m}^3$	Target	Actual $\mu\text{g}/\text{m}^3$	Target	Actual $\mu\text{g}/\text{m}^3$
AQ8: NO2 air quality in AQMA's at receptor locations	Key sites in AQMA								
	NO2 Monitor annual mean, Loughborough Road, West Bridgford		N/A for 2006 2005 was 39.93	No increase	43.2	Reduction by 3.5 $\mu\text{g}/\text{m}^3$	38.4	No increase <40	34.1
	Loughborough Road residential		36.14	No increase	45.8	Reduction by 6 $\mu\text{g}/\text{m}^3$	40.0	No increase <40	35.3
	Midlands Communications on Radcliffe Road, West Bridgford		40.72	Reduction by 1 $\mu\text{g}/\text{m}^3$	48.2	Reduction by 8.5 $\mu\text{g}/\text{m}^3$	40.6	Reduction by 0-1 $\mu\text{g}/\text{m}^3$ <40 *1	(tube 40.6) assessed at receptor as 39.9
	Trent House Flats, Trent Bridge		44.67	Reduction by 5 $\mu\text{g}/\text{m}^3$	52.5	Reduction by 12.5 $\mu\text{g}/\text{m}^3$	39.6	No increase <40	43.3
	Trent Boulevard B, Lady bay area		43.62	Reduction by 4 $\mu\text{g}/\text{m}^3$	50.6	Reduction by 11 $\mu\text{g}/\text{m}^3$	38.0 (revised)	<40	40.3
	Clover lands A52		39.84	No increase	48	Reduction by 8 $\mu\text{g}/\text{m}^3$	44.2	Reduction by 4.5 $\mu\text{g}/\text{m}^3$ <40	38.5
	Windy Ways A52 (Nottingham Knight Island)		41.24	Reduction by 2 $\mu\text{g}/\text{m}^3$	44	Reduction by 4 $\mu\text{g}/\text{m}^3$	39.3	<40	38.8

\*1 this site is on a business premise (Not a relevant receptor). This tube will be mounted on the nearest first floor receptor for the later part of 2009 and on as recommend in the USA 2009..



## Rushcliffe BC Air Quality Action Plan Indicators -continued

Indicator		2010		2011		2012		2013	
		Target	Actual $\mu\text{g}/\text{m}^3$	Target	Actual $\mu\text{g}/\text{m}^3$	Target	Actual $\mu\text{g}/\text{m}^3$	Target	Actual $\mu\text{g}/\text{m}^3$
AQ8: NO2 air quality in AQMA's at receptor locations	Key sites in AQMA								
	NO2 Monitor annual mean, Loughborough Road, West Bridgford	No increase <40							
	Loughborough Road residential	No increase <40							
	37 RR formerly Midlands Communications on Radcliffe Road, West Bridgford	No increase <40							
	Trent House Flats, Trent Bridge	Reduction of 3.3 $\mu\text{g}/\text{m}^3$							
	Trent Boulevard B, Lady bay area	No increase <40							
	Clover lands A52	No increase <40							
	Windy Ways A52 (Nottingham Knight Island)	No increase <40							

Table 9.5 traffic flows in AQMA's( and main roads into AQMA's)

(THIS DATA IS COMMERCIALY CONFIDENTIAL AND MAY NOT BE USED OR REPRODUCED WITHOUT THE PERMISSION OF THE TRANSPORT PLANNING TEAM AT NOTTINGHAMSHIRE COUNTY COUNCIL. ENQUIRIES SHOULD BE MADE TO ANDREI CRUDGINGTON IN THE TRANSPORT PLANNING TEAM (0115) 977 2393)

ROAD NO.	LINK NO.	AQMA	LOCATION (FROM - TO)	AADT 2006	AADT 2007	change from 2006-2007	AADT 2008	change from 2007-2008	AADT 2009	change from 2008-2009	Change from 2006-2009	% OGV1	% OGV2	% PSV
A 52	54	2	Clifton Boulevard: A 453 Clifton Lane - A 60 (Nottingham Knight roundabout)	50,550	51,600	1,050	50,050	-1,550	50,200	150	-350	3.0	3.1	0.3
A 52	55	2	Clifton Boulevard: A 60 (Nottingham Knight roundabout) - A 606 (Wheatcroft roundabout)	34,150	36,700	2,550	35,650	-1,050	35,700	50	1,550	3.3	3.9	0.3
A 52	56		Gamston Lings Bar Road: A 606 (Wheatcroft roundabout) - Ambleside	25,550	24,950	-600	24,650	-300	24,950	300	-600	4.0	6.1	0.2
A 52	57		Gamston Lings Bar Road: Ambleside - A 6011 (Gamston roundabout)	25,650	26,200	550	24,950	-1,250	25,250	300	-400	3.8	4.8	0.3
A 52	58		Radcliffe Road: A 6011 (Gamston roundabout) - Sandy Lane (Holme House)	41,750	42,400	650	40,250	-2,150	40,900	650	-850	3.2	3.5	1.3
A 60	122	1	Trent Bridge, Nottingham: B 685 Meadow Lane - A 6520 Radcliffe Road	46,700	43,100	-3,600	42,850	-250	43,000	150	-3,700	2.4	*	3.3
A 60	123	1	Loughborough Road, West Bridgford: A 6520 Radcliffe Road - A 606 Melton Road	33,200	33,600	400	31,200	-2,400	30,800	-400	-2,400	1.5	1.1	2.8
A 60	124	1	Loughborough Road, West Bridgford: A 606 Melton Road - Rugby Road	13,050	13,200	150	13,250	50	14,300	1,050	1,250	1.2	0.6	1.9
A 60	125		Loughborough Road, West Bridgford: Rugby Road - Boundary Road	13,500	13,650	150	13,550	-100	13,500	-50	0	1.5	0.5	1.5
A 60	126	2	Loughborough Road, West Bridgford: Boundary Road - A 52 (Nottingham Knight roundabout)	18,450	17,650	-800	17,550	-100	17,750	200	-700	0.9	0.4	1.7
A 606	139	1	Melton Road, West Bridgford: A60 Loughborough Road - Musters Road	14,200	14,350	150	12,600	-1,750	12,550	-50	-1,650	1.4	0.2	1.7
A 606	140		Melton Road, West Bridgford: Musters Road - Boundary Road	12,600	12,750	150	12,650	-100	12,600	-50	0	1.4	0.2	2.3
A 606	141		Melton Road, West Bridgford: Boundary Road - A52 (Lings Bar roundabout)	12,600	12,100	-500	12,050	-50	11,800	-250	-800	1.2	0.2	1.7
A 6011	289	1	Lady Bay Bridge, Nottingham: Meadow Lane - A6520 Radcliffe Road	22,400	21,250	-1,150	21,100	-150	21,650	550	-750	3.2	1.4	0.4

A 6011	290	1	Radcliffe Road, West Bridgford: Lady Bay Bridge - Davies Road	26,650	26,950	300	26,800	-150	26,650	-150	0	2.5	1.1	1.0
A 6011	291	1	Radcliffe Road, West Bridgford: Davies Road - Regatta Way	27,850	27,250	-600	27,100	-150	26,950	-150	-900	2.5	1.1	1.7
A 6011	292	1	Radcliffe Road, West Bridgford: Regatta Way - A52 (Gamston roundabout)	26,000	26,300	300	25,900	-400	25,750	-150	-250	2.5	1.0	1.8
A 6520	343	1	Radcliffe Road, West Bridgford: A60 Loughborough Road - A6011 Lady Bay Bridge	18,650	18,850	200	18,750	-100	n/a	n/a	n/a	n/a	n/a	n/a
A 6520	368	1	Radcliffe Road, West Bridgford: A60 Loughborough Road - Fox Road						17,050	-1,700	-1,600	1.3	0.6	2.2
A 6520	369	1	Radcliffe Road, West Bridgford: Fox Road - A6011 Lady Bay Bridge						18,650	-100	0	1.9	0.5	2.0
B 679	507	1	Wilford Lane: B 680 Ruddington Lane, Wilford - A 60 Loughborough Road, West Bridgford	17,050	17,250	200	15,550	-1,700	16,550	1,000	-500	1.9	2.0	2.1
				Overall change on all roads listed		-450		-13,650		1,350	-12,650			
				change in AQMA1		-3,650		-7,000		50	-10,500			
				change in AQMA2		2,800		-2,700		400	500			

AADT: Annual Average Daily Traffic Flow

OGV1 % contains 2 and 3 axle rigid HGV's

OGV2 % contains 4 axle rigid and all articulated HGV's

\* indicates that OGV 1 figure includes OGV 2's

Rushcliffe continue to work toward achieving a reduction in the impact of vehicle movements in the AQMA, however, the greatest positive impact is expected to be from the implementation of the NCC LTP measures as the vast majority of transport is commuter traffic. The measures being currently worked on by the LTP are shown in Table 9.1. Rushcliffe are aware that the Nottingham City have extended their AQMA to the boundary with our AQMA1 and as such it is has been agreed to invite the city to attend the meetings with NCC LTP manager that we host to determine if a more coordinated approach can be adopted. The meetings can be used to explore other measures that can be adopted to improve air quality along this transport corridor.

The transport data in Table 9.5 above indicates that there has been a modest increase in traffic through the AQMA's since last year. This is not a surprise given the economic downturn and fuel price increases in the preceding year which had a big effect in that year. As such an increase in traffic would be expected in subsequent years following some economic recovery. Overall since 2006 the table indicates traffic has reduced in the areas measured. Given that over this time the vehicle fleet will have modernised, (and will continue to modernise) if the trend in traffic levels continues downward then NO<sub>2</sub> should also fall. One concern is that if developments do occur in Rushcliffe and other LA's then there could be an upward pressure on traffic flows in this area in due course. However, these increases are not expected until the LDF is finalised and then only when significant development comes occupied in a number of years times. The planning process will however be used to seek to introduce mitigation measures both for climate change and air quality impacts where ever possible.

## **10 Conclusions and Proposed Actions**

### **10.1 Conclusions from New Monitoring Data**

New monitoring data for 2009 has indicated a number of diffusion tube sites are continuing to show a downward trend but also the variability of air quality monitoring with a minor number of sites experiencing an increase in 2009. The NO<sub>2</sub> Chemiluminescent monitor has shown a downward trend for three consecutive years with several bias adjusted diffusion tube sites in AQMA1 being below the AQO. However, in AQMA 1, Trent House Flats continues to be varied and this year went back up above the AQO along with one of the Trent Boulevard sites (site closet to the Radcliffe Road). These two sites, along with the others on Radcliffe Road indicate that at kerb side levels are still high and that exceedences are still occurring at relevant receptors in AQMA1. As such it will not be possible to seek to revoke AQMA 1 in the forth coming year.

Some sites in 2009 have been changed. These sites have been considered not to represent relevant exposure well and consequently new locations have been selected. The new monitoring locations will enable a better understanding of the exposure in 2010.

In AQMA 2(The A52 ring road) all the sites have been under the AQO's in 2009 indicating compliance within this AQMA. However the Cloverlands site in particular appears to be the closet to the AQO and the results for 3 Botany Close are not sufficient to enable Rushcliffe to proceed to a detailed assessment in order to revoke the AQMA at this time.

Outside of the AQMA new monitoring at Holme House has demonstrated significant exceedences of the annual NO<sub>2</sub> at this receptor. The most likely cause of this exceedence is the traffic lights on the junction causing a stop/start of traffic despite the junction being very open and the area not being built up. In addition monitoring along the length of the road where, traffic remains moving, has indicated no exceedences at relevant locations along this road length. Rushcliffe confirms that a Detailed Assessment is to be undertaken for NO<sub>2</sub> at this site which will include further sampling at the site with NO<sub>2</sub> diffusion tubes and modelling. It is also proposed to move the PM<sub>10</sub> monitor to the site to confirm whether levels of PM<sub>10</sub> are also elevated at this site. A recent bid has been submitted to Defra to fund this work.

### **10.2 Conclusions relating to New Local Developments**

Rushcliffe confirms that there are no new developments that have been identified at this stage that will require more detailed consideration in the next USA or R&A report. The A46 has been subject to an air quality assessment as part of the EIA/public enquiry and this did not indicate there would be any air quality issues during the construction or following the completion of the building works. The site is subject to dust control and management methods to control the impact of dust from the site and is in any case a temporary issue.

### 10.3 Other Conclusions

In general the vast majority of the Rushcliffe area experiences good air quality and the continuing fall in NO<sub>2</sub> at the chemi-luminescent monitor indicates that on this road link NO<sub>2</sub> is moving in the right direction. In addition the AQMA2 has indicated compliance at all receptors points monitored in the AQMA2 over 2009; 2010 monitoring will confirm whether this compliance is to continue. If compliance continues into 2010, this authority will consider whether it is appropriate to consider revoking AQMA 2 at the next R&A report phase.

In AQMA 1 those sites closest to the road have experienced an increase in NO<sub>2</sub> levels (THF & TBLB) on 2008 values and it is disappointing to see this increase. As a result of the increases the LTP have been asked to provide an options appraisal for the Trent Bridge junction with the Radcliffe Road to consider if any other local measures are possible to improve air quality here. The TBLB site is a marginal exceedence and it is expected to move downward in future years if traffic levels do not increase.

Outside of the AQMA's the A46 East Bridgford site has been confirmed to be below the AQO. No further action is required at this site other than continuing to monitor the site until the new A46 is opened at which time there should be a considerable traffic reduction on this road.

The monitoring at the Stragglethorpe Road/A52 has indicated an exceedence at this junction at the façade of a domestic residence. New tubes have already been added to monitor this site and a DA is to be undertaken for NO<sub>2</sub> which is to include the new tubes and modelling. It is not proposed to undertake sampling with a real time NO<sub>2</sub> monitor at the site. Rushcliffe have no monitoring data for PM<sub>10</sub> at the site as such Rushcliffe have been working with the HA to install our PM<sub>10</sub> monitor at the site to gain an understanding of the PM<sub>10</sub> in this area. Verbal agreement has been reached but no date has been set for the site set up. All other sites outside of the AQMA's are in compliance with the AQO's.

Rushcliffe's AQAP is linked to the County Council's LTP as the traffic that is the cause of the exceedences is commuter traffic from outside of Rushcliffe making its way into and out of Nottingham over the three Trent crossing points. The County Council are best placed to influence regionally the behaviour of commuters and as such Rushcliffe are not in direct control of implementing the measures that may have the greatest impact on levels of traffic in the area. The LTP have provided an update on the LTP measures which are indicating they are on target (with minor exceptions) across the county. Unfortunately the format of the table provided and the regional nature of the measures being implemented does not make it possible to calculate the effects of the measures specifically in the AQMA 1 or 2 areas. Rushcliffe is aware of the suggested reporting format to quantify the impacts on the AQMA's on NO<sub>2</sub> however, these impacts are not currently available but can be discussed with the LTP in future meetings to determine if the table can be altered and *where possible* provide this data for future reports.

The LTP have noted that due to finance pressures that capacity to impact on air quality may be reduced in future years. This is apparent by the postponement of the Gamston park and ride site due to lack of finance. This measure if implemented has the potential to reduce commuter traffic on Radcliffe Road/Lady Bay and could result

in reductions in NO<sub>2</sub> if linked to low emission buses serving this site. An alternative to the park and ride is being examined by the LTP.

Rushcliffe is aware that the City has recently extended the AQMA toward Trent Bridge (to the border with AQMA1) acknowledging the air quality impacts of this transport corridor. As such work undertaken by the city in their AQAP should also lead to benefits in AQMA1.

The tram system extension known as NET2 has been given the go ahead and it is expected that building works will commence in 2010 with trams operational in 2013. This measure is a major project that has the potential to remove commuter traffic from the road network once operational with the existing tram system being very well used in the city area. Again though this measure has been the subject of considerable controversy over the route and the financing approach being adopted (workplace parking levy).

Due to the LDF process the SPD has not been able to be formally moved forward by the Rushcliffe BC planning policy team. However the E&WMS have elected to provide some non formal guidance in the interim which is now published on the council's website. This should help assist developers in understanding the impacts of air quality in the area, what is required for applications, where air quality is a concern, and how an assessment can be undertaken. It is not expected that planning policy will be able to produce an SPD until the LDF process has been completed and a period of a further 2 years has been proposed by the planning policy team as Rushcliffe.

Rushcliffe BC is currently in the process of undergoing a fit for purpose review. As part of this process the Council will be looking at areas where remote working can be expanded, as this has already proved to have made significant resource savings, and the staff travel plan. In 2009 no further progress has been made on the implementation of a staff travel plan.

## 10.4 Proposed Actions

The 2009 monitoring data has identified a need to proceed to a detailed assessment for Holme House. Rushcliffe BC has contacted the R&A help desk in 2009 and discussed with them the exceedences at Holme House. The help desk has agreed the need to proceed to a detailed assessment for NO<sub>2</sub> exposure at this site and in 2009 additional diffusion tubes were positioned on the façade of the site as part of this process. The R&A help desk also agreed that monitoring at the site using a chemi-luminescent monitor was not necessary provided the diffusion tubes data is robust. It was agreed an approach of utilising the local bias factor if available and modelling the junction should be sufficient to assess the site for the detailed assessment.

Rushcliffe BC will undertake monitoring of PM<sub>10</sub> at the Holme House site using the Sven Leckel monitor currently operating in AQMA 1 to assess the PM<sub>10</sub> at the junction. Rushcliffe are in contact with the Highways Agency about providing power for the monitor at this site. The monitoring will be subject to the HA agreeing to provide the base and power.

A number of sites were relocated in 2009 to better reflect relevant exposure; however the Heathervale site is not at the worse case exposure point on this road with other receptors being closer to the road. Rushcliffe will therefore relocate this monitoring site in the same vicinity closer to the road to be able to assess worse case exposure.

Monitoring will continue on the sites in AQMA 2 over 2010. If the results indicate all sites are again compliant over 2010 a decision will be made in 2011 progress report to go to a detailed assessment to determine if it is appropriate to revoke the AQMA.

Monitoring has indicated the need to continue to keep the AQMA1 area unchanged and to continue with monitoring in this area.

Work will be undertaken with the NEPWG to further develop the air quality website though the AQSG

Rushcliffe will liaise with the City and County on the new extension of the city AQMA and action plan.

Rushcliffe will request an options appraisal for the Trent Bridge/ Radcliffe Road Junction to determine if additional measures can be implemented at this site to reduce poor air quality.

Rushcliffe will review the A52 traffic study when published and review the findings of the report with regard to air quality impacts

The next report due by Rushcliffe will be a progress report 2011 and detailed assessment for Holme House in 2011.



## 11 References

Highways Agency's Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 Air Quality, May 2007, and accompanying spreadsheet DMRB Screening Method V1,03.xls. July 2007

Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

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Congestion Delivery Plan, Nottinghamshire County Council 2007

Air Quality Considerations for Developers, Rushcliffe Borough Council, 2010

GLM7, Gradko Laboratories NO2 Laboratory Method

BSEN 123412, EC reference Method, British Standard

MDHS 14/2, General methods for the sampling and gravimetric analysis of respirable and total inhalable dust, HSE

Policy G1, Non statutory Local Plan, Rushcliffe Borough Council

PPG 13, planning policy guidance 13, transport, Communities and Local Government (formerly OPDM)

PPS 23, Planning policy statement 23, Planning and pollution control, Communities and Local Government (formerly OPDM)

Policy 36 East Midlands Regional Plan, East Midlands Regional Assembly, 2006

LDF, Local Development Framework, Rushcliffe Development Framework - Core Strategy Option for Consultation. (Consultation document)

Rushcliffe Borough Council published documents are available from [www.Rushcliffe.gov.uk](http://www.Rushcliffe.gov.uk). Air quality reports are located on page <http://www.rushcliffe.gov.uk/doc.asp?cat=10437>

## 12 Glossary of terms

**Air Quality Standard** – these standards represent minimal/no risk health based standards, for ambient concentrations of pollutants. They are based purely on medical evidence, taking no account of costs, benefits or technical feasibility.

**Air Quality Objective** – these objectives take account of both costs and benefits, forming benchmarks in time, against which “Air Quality Standards” can be achieved.

**Annual mean** – The average of the concentrations measured or calculated for each pollutant for one calendar year.

**AQMA** – Air Quality Management Area

**AQAP** – Air Quality Action Plan

**Assessment** – The consideration of whether estimated levels for the relevant future period are likely to exceed the levels set in the objectives.

**AURN** – Automated Urban and Rural Network of air quality monitoring stations

**Background concentration** – Concentration of a particular pollutant thought to be present in an area, which cannot be accounted for by dispersion modelling from local emissions. It is generally caused by transportation of pollutants over long distances.

**CO** – Carbon Monoxide

**Data Capture** – The percentage of all the possible measurements for a given period that were validly measured

**DEFRA** – Department for Environment, Food and Rural Affairs

**DETR** – Department for the Environment and the Regions (Now DEFRA)

**Emissions Inventory** – A full list of sources that emit pollutants into the atmosphere over a sustained period of time.

**Exceedences** – A period of time where the concentration of a pollutant is greater than, or equal to, the appropriate air quality objective.

**IPPC** – Integrated Pollution, Prevention and Control Act 2000

**Maximum hourly average** – The highest hourly reading of air pollution obtained during the time period under study.

**NETCEN** – National Environmental Technology Centre

**NO<sub>2</sub>** – Nitrogen Dioxide

**NO<sub>x</sub>** – Nitrogen Oxides

**Part A installations** – Large emitters of pollution, which are regulated by either the Environment Agency (A1) or Local Authorities (A2)

Part B installations – **Smaller emitters of pollution, which are regulated by local authorities**

**Percentile** – A value found by listing a set of numbers in order and calculating the number below which a certain percent of the data set lies. For example, the 99<sup>th</sup> percentile of values in a data set, is the value below which 99% of the data falls.

**PM<sub>10</sub>** – Particulate Matter with a diameter of 10µm or less.

**QA/QC** – Quality Assurance/Quality Control.

**Running Mean** – A mean or series of means, calculated for overlapping time periods. For example, a daily running 8 hour mean equals any 8 hour period within that day.

**SO<sub>2</sub>** – Sulphur Dioxide.

**µg/m<sup>3</sup>** – Microgrammes per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m<sup>3</sup> means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

**PPB** – Parts per Billion

**LDF** – Local Development Framework

Appendix A: Bias Calculation using AEA DIFFTPAB version 3.

### Checking Precision and Accuracy of Triplicate Tubes

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{gm}^{-3}$	Tube 2 $\mu\text{gm}^{-3}$	Tube 3 $\mu\text{gm}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	06/01/2009	04/02/2009	51.73	51.62	47.57	50	2.4	5	5.9
2	04/02/2009	04/03/2009	43.38	39.89	46.45	43	3.3	8	8.2
3	04/03/2009	01/04/2009	39.04	37.43	34.33	37	2.4	6	5.9
4	01/04/2009	29/04/2009	29.11	31.35	33.27	31	2.1	7	5.2
5	29/04/2009	03/06/2009	27.31	26.59	25.77	27	0.8	3	1.9
6	03/06/2009	02/07/2009	25.88	27.03	26.38	26	0.6	2	1.4
7	02/07/2009	29/07/2009	33.24	34.57	34.88	34	0.9	3	2.1
8	29/07/2009	02/09/2009	31.48	29.82	29.21	30	1.2	4	2.9
9	02/09/2009	29/09/2009	35.08	32.3	30.81	33	2.2	7	5.4
10	29/09/2009	04/11/2009	38.97	45.18	40.26	41	3.3	8	8.1
11	04/11/2009	01/12/2009	38.97	45.18	40.26	41	3.3	8	8.1
12	01/12/2009	03/01/2010	39.14	48.43	39.81	42	5.2	12	12.9
13									

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

Automatic Method		Data Quality Check		
Period	Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
37.7		83	Good	Good
48		80	Good	Good
39.2		88	Good	Good
38		99	Good	Good
28.4		99	Good	Good
21.9		99	Good	Good
25.3		50	Good	For Data Capture
20.8		20	Good	For Data Capture
28.5		72	Good	For Data Capture
38.8		99	Good	Good
37.7		100	Good	Good
28		30	Good	For Data Capture

**Site Name/ ID:** Loughborough Road

Accuracy (with 95% confidence interval)	
without periods with CV larger than 20%	
Bias calculated using 8 periods of data	
Bias factor A	0.95 (0.85 - 1.09)
Bias B	5% (-8% - 18%)
Diffusion Tubes Mean:	37 $\mu\text{gm}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	35 $\mu\text{gm}^{-3}$
Data Capture for periods used: 93%	
Adjusted Tubes Mean:	35 (32 - 41) $\mu\text{gm}^{-3}$

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

Accuracy (with 95% confidence interval)	
WITH ALL DATA	
Bias calculated using 8 periods of data	
Bias factor A	0.95 (0.85 - 1.09)
Bias B	5% (-8% - 18%)
Diffusion Tubes Mean:	37 $\mu\text{gm}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	35 $\mu\text{gm}^{-3}$
Data Capture for periods used: 93%	
Adjusted Tubes Mean:	35 (32 - 41) $\mu\text{gm}^{-3}$

Overall survey --> Good precision Poor Overall DC


(Check average CV & DC from Accuracy calculations)

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Version 03 - November 2006

## Appendix B: Calculations of fall off with distance at receptors

### Calculation of fall of with distance for WL3

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b>	(Note 1)	<b>2.1</b>	metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b>	(Note 1)	<b>7.3</b>	metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>21.8</b>	µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>44</b>	µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b>	(Note 3)	<b>37.4</b>	µg/m <sup>3</sup>

**Note 1:** This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.


**Note 2:** The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

**Note 3:** The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 2: 16/03/09. Created by Dr Ben Marnier. Approved by Prof Duncan Laxen. Contact: [benmarnier@aqconsultants.co.uk](mailto:benmarnier@aqconsultants.co.uk)

Calculation of fall off with distance for A453

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	How far from the KERB was your measurement made (in metres)?	(Note 1)	<b>3.2</b>	metres
<b>Step 2</b>	How far from the KERB is your receptor (in metres)?	(Note 1)	<b>27</b>	metres
<b>Step 3</b>	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	<b>21.8</b>	µg/m <sup>3</sup>
<b>Step 4</b>	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	<b>44.2</b>	µg/m <sup>3</sup>
<b>Result</b>	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	<b>31.6</b>	µg/m <sup>3</sup>

**Warning: your receptor is more than 20m further from the kerb than your monitor, treat result with caution**

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 2: 16/03/09. Created by Dr Ben Marner, Approved by Prof Duncan Laxen. Contact: [benmarner@aqconsultants.co.uk](mailto:benmarner@aqconsultants.co.uk)

**Calculation of fall off with distance for Roam (Acorn)**

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b>	(Note 1)	<b>2.6</b>	metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b>	(Note 1)	<b>9.1</b>	metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>21.8</b>	µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>41.2</b>	µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b>	(Note 3)	<b>35.1</b>	µg/m <sup>3</sup>

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.


Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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**Calculation of fall off with distance for A46 East Bridgford Site**

**This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.**



**Enter data into the yellow cells**

<b>Step 1</b>	How far from the KERB was your measurement made (in metres)?	(Note 1)	<b>12</b>	metres
<b>Step 2</b>	How far from the KERB is your receptor (in metres)?	(Note 1)	<b>7</b>	metres
<b>Step 3</b>	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	<b>21.8</b>	µg/m <sup>3</sup>
<b>Step 4</b>	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	<b>27.4</b>	µg/m <sup>3</sup>
<b>Result</b>	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	<b>28.6</b>	µg/m <sup>3</sup>

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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**Fall off with distance for MC site**

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b>	(Note 1)	<b>9.5</b>	metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b>	(Note 1)	<b>10.5</b>	metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>21.8</b>	µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>40.6</b>	µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b>	(Note 3)	<b>39.9</b>	µg/m <sup>3</sup>

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.


Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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Calculation of fall of with distance for Holme House

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	How far from the KERB was your measurement made (in metres)?	(Note 1)	<b>2.9</b>	metres
<b>Step 2</b>	How far from the KERB is your receptor (in metres)?	(Note 1)	<b>6.4</b>	metres
<b>Step 3</b>	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	<b>21.8</b>	µg/m <sup>3</sup>
<b>Step 4</b>	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	<b>61.6</b>	µg/m <sup>3</sup>
<b>Result</b>	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	<b>53.5</b>	µg/m <sup>3</sup>

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 2: 16/03/09. Created by Dr Ben Marnier, Approved by Prof Duncan Laxen. Contact: [benmarnier@aqconsultants.co.uk](mailto:benmarnier@aqconsultants.co.uk)

**Calculation of fall of with distance for A52RT**

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b>	(Note 1)	<b>3.3</b>	metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b>	(Note 1)	<b>8.5</b>	metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>21.8</b>	µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	<b>39.1</b>	µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b>	(Note 3)	<b>34.8</b>	µg/m <sup>3</sup>

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 2: 16/03/09. Created by Dr Ben Marnier; Approved by Prof Duncan Laxen. Contact: [benmarnier@aqconsultants.co.uk](mailto:benmarnier@aqconsultants.co.uk)

**Diffusion Tube Bias Adjustment Factors**

Gradko International Limited, 20%TEA in Water, R&A bias factor is 0.90 available from <http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube310310.xls>

**Factor from Local Co-location Studies (if available)**

The monthly means and the calculation of the local bias factor for the co-location study are shown in Appendix A: Bias Calculation using AEA DIFFTPAB version 3. The site is roadside location with the inlet head being 5m from the road kerb. The local factor used in this study is 0.95

**Discussion of Choice of Factor to Use**

A local bias factor has been used of 0.95 this is calculated using the AEA DIFFTAB spreadsheet and is consistent with previous year's bias factor (0.92). It is recognised that data capture could have been better at the site however the site still has sufficient data capture with good correlation to allow the use of a local factor.

The national factor available from March 2010 at

<http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube310310.xls> is 0.90. Prior to this date the provisional factor reported through the spreadsheet was greater than 0.90 and nearer the 0.95 produced by Rushcliffe. Consequently as the difference between the local and national was small the local factor was chosen which provided a slight element of conservatism in the correction of the diffusion tube data. TG(09) states that it is preferable to use a local bias factor where possible.

It is noted that the 3 nearest sites (in the Nottingham City area) to Millicent Road where the monitor is located have reported factors on the spreadsheet of 0.89, 0.92 and 0.92 for the period of 2009 (March 2010 spreadsheet). Nottingham city utilise the same Lab and tube preparation as Rushcliffe which again indicates the 0.95 used is conservative in its use.

The effect of this is that if a lower bias factor were to be adopted diffusion tube values would fall. This would still leave the THF site above the AQO in AQMA 1 but other sites that are just above the AQO for the annual mean would be just below. This would not alter the conclusions for AQMA1 to remain or the decision to go to a DA for Holme house. In addition as all sites in AQMA 2 have been shown to be below the AQO it does not alter the conclusion for this AQMA either.

**PM Monitoring Adjustment**

There is no adjustment factor required for the PM10 monitor as the monitor is a gravimetric monitor that is EU equivalent.

**Short-term to Long-term Data adjustment**

Period mean is the period November 2009 to December 2009

The annual mean is for the year 2009

<b>Site</b>	<b>Site Type</b>	<b>Annual Mean</b>	<b>Period Mean</b>	<b>Ratio (AM/PM)</b>
Chesterfield	background	19.59	22.92	0.855
Coventry Memorial Park	background	17.47	20.21	0.864
Northampton	background	21.14	24.46	0.865
Barnsley Gawber	background	20.09	27.80	0.723
Average (Ra) =				0.827

**QA/QC of automatic monitoring**

The PM10 is serviced twice annually by ETI. The operation of the monitor and the filter changes and data handling is by trained council employees with filters being conditioned and weighed by TES Bretby using in house procedures.

The NOx monitor is serviced twice yearly by Casella Measurement. Data handling is undertaken using Envista software and rescaling of data is carried out by trained council operators. Calibration checks of the NOx monitor take place at least fortnightly with certified gas supplied by BOC. Zero calibration is undertaken using a air scrubber which is replenished as part of the service contract. Further details of the QA/QC procedures is contained in Chapter 2.2 Quality Control (QA/QC).

## Appendix C: Nitrogen Dioxide Continuous Monitoring Results for 2009

### Nitrogen Dioxide Continuous Monitoring Results 2009

Air Quality Objectives for Nitrogen Dioxide

There are two objectives for NO<sub>2</sub>:

(i) 200µg/m<sup>3</sup> measured as a 1 hour mean, not to be exceeded more than 18 times a year

(ii) 40µg/m<sup>3</sup> measured as an annual mean (µg/m<sup>3</sup> = micrograms/cubic metre)

NO<sub>2</sub> results based on 1 hour exposure

	average 1 hr (ppb)	min 1 hr (ppb)	max 1 hr (ppb)	%data capture	average 1 hr (µg/m <sup>3</sup> )	min 1 hr (µg/m <sup>3</sup> )	max 1 hr (µg/m <sup>3</sup> )
Jan-09	20.24	0.30	67.48	94	38.72	0.57	129.09
Feb-09	25.47	2.19	67.46	71	48.71	4.19	129.05
Mar-09	20.51	0.82	74.94	88	39.23	1.58	143.36
Apr-09	18.84	2.52	53.39	99	36.04	4.83	102.14
May-09	13.26	2.62	37.77	99	25.36	5.01	72.25
Jun-09	11.96	1.41	39.20	99	22.88	2.69	74.99
Jul-09	13.17	2.87	46.13	48	25.19	5.50	88.24
Aug-09	10.00	2.32	24.50	18	19.13	4.44	46.86
Sep-09	14.05	2.51	48.72	74	26.88	4.79	93.21
Oct-09	19.86	2.66	54.33	99	37.99	5.08	103.93
Nov-09	18.99	1.57	57.04	100	36.33	3.01	109.11
Dec-09	26.05	2.48	99.72	35	49.84	4.75	190.76
annual mean	<b>17.86</b>				<b>34.2</b>		
Overall % data capture				<b>77.0%</b>			
No > 105 ppb (200 µg/m <sup>3</sup> )	<b>0</b>				<b>0</b>		
99.8th percentile for 2009	<b>62.7</b>				<b>119.7</b>		

Monitoring location: Loughborough Road, West Bridgford, Nottingham

Grid: 

458173,	337771
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Please note: The grid location is provided to *indicate* the position of the monitor only  
For a more accurate location you should contact the E&WMS

Appendix D: Diffusion tube 2009 monthly results for all sites

Unbiased Monthly Diffusion Tube Results																				Mean 2009 unadjusted ug/mg3	co-located mean	2009 Mean value Bias adjusted (0.95)
DATE ENDED	AQMA	Name	Location	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	%	period %					
	1	1 LOUGHBH RD W/B	NA1	51.73	43.36	39.04	29.11	27.31	25.88	33.24	31.46	35.08	n/a	38.97	39.14	92%	92%	35.85				
	1	1 LOUGHBH RD W/B	NA2	51.62	39.89	37.43	31.35	26.59	27.03	34.57	29.82	32.30	n/a	45.18	48.43	92%	92%	36.75				
	1	1 LOUGHBH RD W/B	NA3	47.57	46.45	34.33	33.27	25.77	26.36	34.86	29.21	30.81	n/a	40.26	39.81	92%	92%	35.34	35.98			
	1	EDWARD ROAD, LADY BAY	ER	54.30	54.44	38.33	33.62	24.77	36.36	23.66	24.41	33.28	34.20	37.82	41.17	100%	100%	36.36				
	1	LOUGHBOROUGH ROAD (RES)	LR	48.80	35.72	38.25	30.13	35.85	34.43	39.35	34.00	34.08	37.59	36.72	40.81	100%	100%	37.14				
	1	PARTICULATE MONITOR	PM10	49.94	34.57	34.33	33.48	28.66	36.97	27.23	n/a	36.43	34.85	33.59	42.57	92%	92%	35.69				
	1	RADCLIFFE ROAD	RR	45.00	60.54	49.30	37.71	24.54	44.21	39.50	33.16	46.29	36.27	44.93	45.54	100%	100%	42.25				
	1	SWANS HOTEL	SH	49.16	39.94	35.47	29.85	21.01	40.87	26.12	22.06	32.66	36.28	37.38	43.45	100%	100%	34.52				
	1	THE POINT	POINT	36.31	46.55	32.37	30.57	22.39	25.05	22.49	22.11	28.47	29.49	35.12	36.66	100%	100%	30.63				
	1	TRENT BOULEVARD A	TBLA	51.49	46.04	47.62	33.05	28.72	33.86	34.39	33.74	37.41	38.82	40.37	41.66	100%	100%	38.93				
	1	TRENT BOULEVARD B	TBLB	48.73	57.16	43.04	38.21	30.86	42.03	31.74	36.37	44.25	47.20	41.19	48.22	100%	100%	42.42				
Oct-09	1	TRENT BRIDGE	TB	75.43	80.39	66.75	51.76	47.28	66.06	55.06	49.91	68.09	60.48	N/A	N/A	83%	100%	62.12				
	1	TRENT BRIDGE INN	TBI	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	57.40	56.25	17%	100%	56.83				
	1	TRENT HOUSE	THF	74.91	50.19	43.81	44.55	36.30	46.88	37.05	35.99	37.31	43.77	45.74	51.39	100%	100%	45.66				
	1	TRENT HOUSE	THF2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45.57	n/a	8%	50%	45.57	45.61			
	1	WILFORD LANE 3	WL3	65.03	63.10	54.25	n/a	34.55	33.73	35.92	37.11	41.21	41.24	53.75	49.13	92%	92%	46.27				
Dec-09	1	Roam(Acorn hotel lamp post)	Roam(Acorn)				43.34	35.76	42.83	43.08	38.08	43.22	40.84	50.52	52.79	75%	100%	43.38				
	2	8 SALTBY GREEN	SG	n/a	n/a	31.26	26.84	21.22	22.26	29.08	26.28	25.48	29.67	34.62	37.80	83%	83%	28.45				
	2	A60/A52 JUNCTION (Nott Knight)	NK	70.79	55.60	54.05	46.31	59.73	58.23	40.59	37.74	44.34	n/a	51.89	52.14	92%	92%	51.95				
Oct-09	2	BOTANY CLOSE	A52/WB	75.38	59.93	n/a	n/a	64.68	68.59	64.17	44.40	54.44	61.86	N/A	N/A	67%	80%	61.68				
	2	3 BOTANY CLOSE	3BT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	36.76	40.14	17%	100%	38.45				
	2	CLOVERLANDS(Façade)	CL	61.21	58.80	46.55	38.36	37.16	27.58	38.29	29.66	31.50	38.74	38.85	n/a	92%	92%	40.61				
	2	CLOVERLANDS(Façade)	CLa	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	39.42	n/a	8%	8%	39.42	40.51			
Oct-09	2	CLOVERLANDS 2 (Lamp post)	CL2	48.58	n/a	38.58	n/a	28.02	19.35	30.03	26.66	27.40	29.66	N/A	N/A	67%	80%	31.04				
	2	LANDMERE NURSING HOME	LL	42.48	38.28	37.47	27.39	21.61	22.74	27.47	25.76	22.88	31.39	33.50	37.49	100%	100%	30.71				
	2	WINDYWAYS	WW	52.97	45.58	40.51	39.03	33.36	33.27	38.49	42.96	34.48	35.80	48.83	44.77	100%	100%	40.84				
	no	A453	A453	58.15	42.56	43.29	51.01	49.99	44.06	48.07	42.76	40.83	42.41	48.68	45.88	100%	100%	46.47				
	no	A46 EAST BRIDGFORD	A46/EB	30.25	50.73	35.44	22.33	15.50	23.06	24.36	23.10	29.22	30.07	29.86	37.20	100%	100%	29.26				
	no	A46 EAST BRIDGFORD 2	A46/EB2	35.88	39.94	25.82	24.64	22.35	22.51	25.32	23.28	30.94	25.65	27.58	36.81	100%	100%	28.39	28.83			
	no	A52 LINGS BAR Hospital	GLB HOS	36.50	32.26	27.63	24.94	13.31	22.44	15.91	15.20	21.82	22.51	22.88	28.70	100%	100%	23.68				
	no	A52 SAXONDALE	A52/S	35.69	70.10	45.15	38.91	30.94	37.12	33.95	27.69	42.79	32.50	30.50	40.47	100%	100%	38.82				
	no	A52 SOUTH AVE, RADCLIFFE	A52/SA	48.85	45.39	n/a	36.70	31.52	40.69	30.99	26.52	30.49	37.92	33.10	40.53	92%	92%	36.61				
Oct-09	no	A52 HOME HOUSE, STRAGGLETHORPE	A52/HH	81.49	69.64	58.22	60.62	63.65	75.41	72.65	49.79	58.84	58.09	n/a	n/a	83%	100%	64.84				
	no	RADCLIFFE A52	A52/RT	55.60	51.33	50.62	38.14	35.12	25.81	42.81	34.85	39.89	37.09	44.89	52.08	100%	100%	41.13				
	no	A52 HOME HOUSE(façade) STRAGGLETHORPE	A52/HHF1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	54.37	52.93	17%	100%	53.65				
	no	A52 HOME HOUSE(façade) STRAGGLETHORPE	A52/HHF2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	49.92	61.02	17%	100%	55.47				
	no	A52 HOME HOUSE(façade) STRAGGLETHORPE	A52/HHF3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53.25	52.63	17%	100%	52.94	54.02			
	no	STRAGGLETHORPE ROAD	SR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	31.77	44.66	17%	100%	38.23				
	no	21 HEATHERVALE	HV	50.28	44.59	41.46	27.56	20.53	20.41	20.06	20.44	25.90	27.22	33.30	40.32	100%	100%	31.01				
	no	34 BRIDGFORD ROAD	BR	36.31	39.53	32.01	25.72	21.67	21.59	23.89	21.66	26.08	33.41	n/a	37.35	92%	92%	29.02				
	no	39/41 WILFORD LANE	WLR/2	42.62	36.42	32.88	34.08	22.63	28.83	27.81	24.33	29.27	29.51	33.10	39.10	100%	100%	31.72				
	no	HAMPTON ROAD	HR	32.17	33.05	26.83	20.46	13.65	14.44	n/a	15.79	19.56	21.55	22.82	32.39	92%	92%	22.97				
	no	HICKORY HOUSE	HH	44.58	49.46	32.31	29.19	19.62	23.09	23.67	21.89	27.68	30.23	35.30	39.38	100%	100%	31.37				
Oct-09	no	MIDLANDS COMM (Radcliffe Rd)	MC	53.35	42.88	48.95	39.88	33.00	45.18	42.78	34.62	42.83	44.12	N/A	N/A	83%	83%	42.76				
	no	37 RADCLIFFE ROAD	37RR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	34.27	39.94	17%	100%	37.11				
	no	PEVERIL COURT	PC	39.78	41.39	33.82	29.80	22.78	28.28	25.66	23.80	28.56	31.12	33.28	42.27	100%	100%	31.71				
	no	PEVERIL COURT 2	PC2	44.70	44.55	32.58	29.04	23.42	25.92	23.71	23.97	29.22	31.94	31.41	39.87	100%	100%	31.69	31.70			
	no	THE BEECHES HOTEL	BH	42.63	36.52	34.88	32.39	23.69	29.30	28.57	18.74	30.24	28.12	38.68	34.29	100%	100%	31.50				
		blank	blank	0.30	0.44	0.18	0.14	0.13	0.14	0.41	0.16	0.19		0.18	0.14			0.22				
		Comments		20%TEA																		





Appendix E: New roads in Rushcliffe with sect 38 agreements with the Nottinghamshire transport planners.

APC No.	Location	Developer	Road Length (m)	S38 Agreement Date	Adoption date	Application ref.
	East Leake Hall (Walnut Gardens)	David Wilson Homes		01/10/2008		05/00956/FUL
R94	Belvoir Vale Adult Training Centre, Grantham Road, Bingham	Ben Bailey Homes	170	16/06/2006		05/00291/REM
R95	Clifton Road, Ruddington, Former Station Yard	Crest Nicolson	430	06/06/2007		05/01438/REM
R96	Land to the South of Nottingham Road, Bingham	Fairclough/Miller Homes	2460			05/00683/REM
	Phase 1A	"	230	13/09/2006		
	Phase 1B	"	167	21/11/2006		
	Centre Section (see R102)	"	869			
	Phase 2 (Eastern End)	"	1194	21/11/2006		
R98	Gables Farm, Bars Hill, Costock	Infrastructure Design Ltd for Charles Church South Midlands	275	13/04/2007		06/00040/REM
R99	Hill Drive, Bingham	Rushcliffe Homes/Metropolitan Housing Trust	75	Requested 30/1/07		05/00483/FUL
R100	Gotham Primary School, Kegworth Road, Gotham	Ivan Poole	97	10/06/2008		06/01009/REM
R101	Camelot Street, Ruddington, Depot	Crest Nicolson	440	19/06/2008		04/01632/REM

R102	Land South of Mallow Way and Mill Hill Road, Bingham	Redrow Homes	869			07/00353/REM
R103	Debdale Lane, Keyworth	William Davis	74	15/04/2008	03/03/2010	06/02056/FUL
R104	Hawthorne Farm, Main, Road, Shelford	JMS/G2 Developments	79	06/01/2010		06/00967/FUL
R105	Plumtree Road, Cotgarve	Miller homes	121	28/07/2008		07/02056/FUL
Filed with s38s	Closes Side Lane, East Bridford	Eastern Shires Housing Association	99	Requested 28/1/08		06/02127/FUL
R106	Windmill Inn, 34 Nottingham Road, Gotham	Whytehall Homes	52	20/06/2008		07/01531/FUL
R107	Yew Tree Farm, Lombard Street, Orston	Exemption				
R108	Rectory Sutton Bonnington	David Wilson Homes	195	22/10/2008		07/00410/FUL
Filed with s38s	Bruce Drive, West Bridgford	Westbury Homes				
R109	Croyde House, Radcliffe Rd, Gamston.	Bovis Homes	47			Withdrawn 08/00501/FUL
R110	Bingham Road, Radcliffe-On-Trent.		183			05/01669/FUL
R111	Land rear: 2-8 Hoe View Rd, Cropwell Bishop.	Eastern Shires Housing Association	90			08/01703/FUL
R112	Land off Gotham Road, East Leake.	Barratt/David Wilson Homes North Midlands Ltd	517			
R113	Land off Gotham Road, East Leake.	J.S. Bloor (Measham) Ltd	515			
R114	RAF Newton 83 Dwellings	Bellway				06/01226/OUT

## Appendix F: Traffic flows from 2008 to 2009.

LOCATION (FROM - TO)	AADT 2008	AADT 2009	% OGV1	% OGV2	% PSV	difference	%diff
Leicestershire boundary - A 606 Melton Road	25250	24300	5	9	0	-950	-3.8%
A 606 Melton Road - Nottingham Road (Cotgrave crossroads)	16500	16600	5	9	0	100	0.6%
Nottingham Road (Cotgrave crossroads) - A 52 (Saxondale roundabout)	18150	18250	4.3	8.8	0.5	100	0.6%
A 52 (Saxondale roundabout) - A 6097 (Margidunum roundabout)	25350	26350	4.0	7.0	0.3	1000	3.9%
A 6097 (Margidunum roundabout) - Main Street, Farndon	24250	22600	4.0	6.9	0.5	-1650	-6.8%
Clifton Boulevard: A 453 Clifton Lane - A 60 (Nottingham Knight roundabout)	50050	50200	3.0	3.1	0.3	150	0.3%
Clifton Boulevard: A 60 (Nottingham Knight roundabout) - A 606 (Wheatcroft roundabout)	35650	35700	3.3	3.9	0.3	50	0.1%
Gamston Lings Bar Road: A 606 (Wheatcroft roundabout) - Ambleside	24650	24950	4.0	6.1	0.2	300	1.2%
Gamston Lings Bar Road: Ambleside - A 6011 (Gamston roundabout)	24950	25250	3.8	4.8	0.3	300	1.2%
Radcliffe Road: A 6011 (Gamston roundabout) - Sandy Lane (Holme House)	40250	40900	3.2	3.5	1.3	650	1.6%
Sandy Lane (Holme House) - Nottingham Road, Radcliffe-on-Trent	34350	34850	3.2	3.5	1.3	500	1.5%
Radcliffe Bypass: Nottingham Road - Cropwell Road	30250	30650	3.2	3.5	1.3	400	1.3%
Radcliffe Bypass: Cropwell Road - Bingham Road	25200	25550	3.2	3.5	1.3	350	1.4%
Bingham Road, Radcliffe-on-Trent - A 46 (Saxondale roundabout)	26100	26500	3.2	3.5	1.3	400	1.5%
Bingham Bypass: A 46 (Saxondale roundabout) - Grantham Road, Bingham	15500	15900	4.2	6.1	0.5	400	2.6%
Grantham Road, Bingham - C 3, Elton	16600	17050	4.2	6.1	0.5	450	2.7%
C 3, Elton - Leicestershire boundary	15000	15400	4.2	6.1	0.5	400	2.7%
Trent Bridge, Nottingham: B 685 Meadow Lane - A 6520 Radcliffe Road	42850	43000	2.4	*	3.3	150	0.4%
Loughborough Road, West Bridgford: A 6520 Radcliffe Road - A 606 Melton Road	31200	30800	1.5	1.1	2.8	-400	-1.3%
Loughborough Road, West Bridgford: A 606 Melton Road - Rugby Road	13250	14300	1.2	0.6	1.9	1050	7.9%
Loughborough Road, West Bridgford: Rugby Road - Boundary Road	13550	13500	1.5	0.5	1.5	-50	-0.4%
Loughborough Road, West Bridgford: Boundary Road - A 52 (Nottingham Knight roundabout)	17550	17750	0.9	0.4	1.7	200	1.1%
Loughborough Road, Ruddington: A 52 Clifton Boulevard - B 680 Kirk Lane	15750	15700	1.5	1.7	0.6	-50	-0.3%
Loughborough Road, Ruddington: B 680 Kirk Lane - Mere Way	17650	17600	1.4	1.6	0.6	-50	-0.3%
Mere Way, Ruddington - Pendock Lane, Bradmore	13750	13700	1.9	1.8	0.4	-50	-0.4%
Pendock Lane, Bradmore - Gotham Lane, Bunny	12200	12150	2.0	1.5	0.5	-50	-0.4%
Gotham Lane, Bunny - C 26, Costock	9000	8950	2.0	1.5	0.5	-50	-0.6%
C 26, Costock - A 6006, Rempstone	8550	8500	2.1	2.2	0.6	-50	-0.6%

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A 6006, Rempstone - Leicestershire boundary	7400	6450	2.1	1.4	0.5	-950	-12.8%
Leicestershire boundary - Kegworth Road, Ratcliffe-on-Soar	26450	26200	4.2	9.0	0.6	-250	-0.9%
Kegworth Road, Ratcliffe-on-Soar - C 4 Clifton Lane (Crusader roundabout)	22750	22500	4.2	9.0	0.6	-250	-1.1%
Melton Road, West Bridgford: A60 Loughborough Road - Musters Road	12600	12550	1.4	0.2	1.7	-50	-0.4%
Melton Road, West Bridgford: Musters Road - Boundary Road	12650	12600	1.4	0.2	2.3	-50	-0.4%
Melton Road, West Bridgford: Boundary Road - A52 (Lings Bar roundabout)	12050	11800	1.2	0.2	1.7	-250	-2.1%
A52 (Lings Bar roundabout) - Clipstone Lane (Plumtree turn)	23550	23250	2.4	0.9	1.0	-300	-1.3%
Clipstone Lane (Plumtree turn) - A46	15650	15700	2.7	1.6	0.7	50	0.3%
A46 - Upper Broughton	5800	6500	3.6	3.9	0.7	700	12.1%
Upper Broughton - Leicestershire boundary	5050	5000	3.6	3.9	0.7	-50	-1.0%
Leicestershire boundary - Park Lane, Sutton Bonington	10500	10600	3.7	5.4	0.3	100	1.0%
Park Lane, Sutton Bonington - C4 (East Leake Turn)	7600	7700	3.7	5.4	0.3	100	1.3%
C4 (East Leake turn) - A60, Rempstone	8450	8550	3.7	5.4	0.3	100	1.2%
A60, Rempstone - Leicestershire boundary	8100	8200	3.7	5.4	0.3	100	1.2%
Lady Bay Bridge, Nottingham: Meadow Lane - A6520 Radcliffe Road	21400	21650	3.2	1.4	0.4	250	1.2%
Radcliffe Road, West Bridgford: Lady Bay Bridge - Davies Road	26800	26650	2.5	1.1	1.0	-150	-0.6%
Radcliffe Road, West Bridgford: Davies Road - Regatta Way	27100	26950	2.5	1.1	1.7	-150	-0.6%
Radcliffe Road, West Bridgford: Regatta Way - A52 (Gamston roundabout)	25900	25750	2.5	1.0	1.8	-150	-0.6%
A612, Lowdham - A46 (Margidunum roundabout)	18350		3.0	3.4	0.2	n/a	n/a
Radcliffe Road, West Bridgford: A60 Loughborough Road - Fox Road		17050	1.3	0.6	2.2	-1700	-9.1%
Radcliffe Road, West Bridgford: Fox Road - A6011 Lady Bay Bridge		18650	1.9	0.5	2.0	-100	-0.5%
Radcliffe Road, West Bridgford: A60 Loughborough Road - A6011 Lady Bay Bridge	18750		1.9	0.5	2.0	-900	-4.8%
<b>B roads &gt; 10,000 AADT</b>							
Wilford Lane: B 680 Ruddington Lane, Wilford - A 60 Loughborough Road, West Bridgford	15550	16550	1.9	2.0	2.1	1000	6.4%
<b>C roads &gt; 10,000 AADT</b>							
Stragglethorpe Lane: A 52, Bassingfield - Main Road, Cotgrave	7150	7150	1.2	0.6	2.4	0	0.0%

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Major Junctions in AQMAs					AADT junction	difference	% change
	leg1	leg2	leg3	leg4			
Nottingham Knight Island 2008	17750	35650	15700	50050	59575		
Nottingham Knight Island 2009	17750	35700	15700	50200	59675	100	0.2%
Radcliffe Road/Trent Bridge (TBI Junction) 2008	42850	18750	31200		139200		
Radcliffe Road/Trent Bridge (TBI Junction) 2009	43000	18650	30800		138675	-525	-0.4%
lady bay junction 2008	18750	21400	26800		100425		
lady bay junction 2009	18650	21650	26650		100425	0	0.0%
wilford lane/loughborough road junction 2008	15550	31200	13250	12600	36300		
wilford lane/loughborough road junction 2009	16550	30800	14300	12550	37100	800	2.2%

**This data is commercially confidential and cannot be used unless permission is provided by the Nottinghamshire Transport Planning team.**

Appendix G: Extract from A453 Widening M1 Junction 24 to A52 Nottingham, summary proof of evidence, Air Quality, Public Enquiry.

The local air quality assessment predicted that exposure to respirable particulates at 12,587 receptors will reduce with an increase in exposure at 5,043 properties. The overall Assessment Score for respirable particulate indicates that the overall effect of the scheme is likely to reduce net receptor exposure. Nitrogen dioxide exposure at 13,304 receptors is predicted to reduce with an increase in exposure at 6,080 properties. The Overall Assessment Score for NO<sub>2</sub> indicates that the overall effect of the scheme is likely to increase net receptor exposure.

3.2 The local air quality assessment illustrates that a relatively large number of properties in the region can expect to benefit from small reductions in exposure to NO<sub>2</sub> and respirable particulates, whilst a smaller number of properties – predominantly within the A453 corridor itself, will have proportionately larger increases in exposure.

3.3 The detailed local air quality assessment concluded that the annual average National Air Quality Objective of not exceeding 40 µg/m<sup>3</sup> for both nitrogen dioxide and respirable particulate is predicted to be achieved at all receptors along the A453 corridor both with and without the proposed scheme. The highest predicted annual average NO<sub>2</sub> level is 23.98 µg/m<sup>3</sup> and the highest predicted respirable particulate level is 21.65 µg/m<sup>3</sup>. On the basis that neither of the annual average Objectives are predicted to be exceeded it is my opinion that the scheme will have no significant effect on the health of the community as a whole.

3.4 Nine Air Quality Management Areas have been designated by local authorities on the regional road network surrounding the A453 scheme. These have been designated due to predicted exceedences of the annual average National Air Quality Objective for nitrogen dioxide at residential receptors. Of these AQMAs, five are predicted to experience improvements in air quality as a result of the A453 scheme, while four are predicted to be adversely effected. On the basis of the results from the detailed assessment of effects on the AQMAs it is my opinion that the overall effect of the scheme on local air quality is neutral.

3.5 The regional air quality assessment concludes that emissions of nitrogen oxides (NO<sub>x</sub>) from traffic on roads affected by the scheme is predicted to be 47 tonnes (3%) less 'with' the A453 scheme than 'without' in 2012. Emissions of total hydrocarbons (THC) from traffic on roads affected by the scheme are predicted to be 8 tonnes (3.41%) less 'with' the A453 scheme than 'without'. Emissions of carbon monoxide (CO) from traffic on roads affected by the scheme are predicted to be 40 tonnes (2.6%) less with the A453 scheme than 'without'.

3.6 The strategic air quality assessment concludes that the scheme will increase CO<sub>2</sub> emissions in 2012 by 688 tonnes when comparing the 'do-something' scenario to the 'do-minimum'. This represents an increase of 0.05% in carbon emissions in the opening year. Across the 60 years of the scheme, the TUBA model predicts an increase of CO<sub>2</sub> emissions of 77,697 tonnes when comparing the 'do-something' scenario to the 'do-minimum'. This represents an increase of 0.079% in carbon emissions over a 60-year lifespan.

3.7 The TUBA model provides as robust a method for calculating carbon emissions as is currently available. However, it is not sufficiently flexible to fully predict the effect of congestion on carbon emissions. The TUBA model assumes that traffic moves at a steady state speed. In congested conditions, driving behaviour is much more based on a cycle of acceleration and deceleration, which produces relatively higher emissions per unit distance travelled than steady state driving. By

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reducing congestion, the scheme will result in a reduction in non steady state driving conditions and will therefore result in reduced emissions. It is my opinion that the way the TUBA model calculates greenhouse gas emissions from traffic means that this likely reduction in emissions is not fully accounted for by the model, resulting in an overly pessimistic prediction of carbon emissions.