

# Updating & Screening Assessment of Air Quality within the Borough of Reigate and Banstead.

August 2009

Reigate and Banstead Borough Council, Environmental Health Services,  
Town Hall, Castlefield Road, Reigate, Surrey, RH2 0SH. Telephone: 01737 276403 Fax: 01737 276404.



## Document Control

<b>Client</b>	Reigate and Banstead Borough Council	<b>Principal Contact</b>	Leon Hibbs
---------------	--------------------------------------	--------------------------	------------

<b>Job Number</b>	J888
-------------------	------

<b>Report Prepared By:</b>	Dr Clare Beattie and Kiri Brown
----------------------------	---------------------------------

### Document Status and Review Schedule

Issue No.	Report No.	Date	Status	Reviewed by
1	888/1/D1	7 <sup>th</sup> May 2009	Draft Report	Prof. Duncan Laxen
2	888/1/D2	14 <sup>th</sup> May 2009	Draft Report	Prof. Duncan Laxen
3	888/1/F1	18 <sup>th</sup> May 2009	Final Report	Leon Hibbs
4	888/1/F2	5 <sup>th</sup> August 2009	Final Report	Produced and reviewed Leon Hibbs

This report has been prepared by Air Quality Consultants Ltd on behalf of the Client, taking into account the agreed scope of works. Unless otherwise agreed, this document and all other Intellectual Property Rights remain the property of Air Quality Consultants Ltd.

In preparing this report, Air Quality Consultants Ltd has exercised all reasonable skill and care, taking into account the objectives and the agreed scope of works. Air Quality Consultants Ltd does not accept any liability in negligence for any matters arising outside of the agreed scope of works.

When issued in electronic format, Air Quality Consultants Ltd does not accept any responsibility for any unauthorised changes made by others.

When printed by Air Quality Consultants Ltd, this report will be on Evolve Office, 100% Recycled paper.

**Air Quality Consultants Ltd**  
**23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086**  
**12 Airedale Road, London SW12 8SF Tel: 0208 673 4313**  
**aqc@aqconsultants.co.uk**

Registered Office: 12 St Oswalds Road, Bristol, BS6 7HT  
 Companies House Registration No: 2814570

## Executive Summary

This report presents the findings of Reigate and Banstead Borough Council's third Updating and Screening Assessment (USA) of air quality within the Borough. The USA evaluates new and changed sources to identify those that may give rise to a risk of an exceedence of an air quality objective. Results from monitoring within the Borough are also presented and evaluated in relation to the objectives. Where a risk of an exceedence is identified at a relevant location the Council will proceed to a Detailed Assessment.

The monitoring carried out in the Borough has not identified any exceedences of the PM<sub>10</sub> or benzene objectives.

The nitrogen dioxide results show that the annual mean objective has been met at the majority of locations within Reigate and Banstead. A substantial number of locations within the Air Quality Management Areas (AQMAs) are, however, still showing exceedences. In addition, a number of new sites not currently in AQMAs have concentrations above the objective. In Redhill, there are 4 monitoring locations showing exceedences and it is proposed that a Detailed Assessment is carried out covering Redhill, examining relevant exposure in detail. In addition, the diffusion tube on Reigate Hill is also showing exceedences. This has been extrapolated back to the façade of the nearest property and exceedences are still likely at the façade of the nearest property. A Detailed Assessment is also required for this location.

The USA has not identified any significant changes in emissions sources within the Borough. There have also been no new relevant industrial installations and no new or substantially altered roads within the Borough. One road junction (A23 and Maple Road) has been identified as potentially significant and assessed using the DMRB screening method, but it is concluded that a Detailed Assessment is not required for this location. A 0.84 MW biomass boiler has also been assessed using ADMS4 and it is concluded that a Detailed Assessment is not required at this location. There are no other significant new commercial, domestic or fugitive sources of emissions.

A Detailed Assessment is therefore required in 2010, in addition to a Progress Report.

# Table of Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	Description of Local Authority Area	4
1.2	Purpose of Report	4
1.3	Air Quality Objectives	4
1.4	Summary of Previous Review and Assessments	6
<b>2</b>	<b>New Monitoring Data</b>	<b>12</b>
2.1	Summary of Monitoring Undertaken	12
2.2	Comparison of Monitoring Results with AQ Objectives	18
<b>3</b>	<b>Road Traffic Sources</b>	<b>29</b>
3.1	Narrow Congested Streets with Residential Properties Close to the Kerb	29
3.2	Busy Streets Where People May Spend 1-hour or More Close to Traffic	29
3.3	Roads with a High Flow of Buses and/or HGVs.	29
3.4	Junctions	29
3.5	New Roads Constructed or Proposed Since the Last Round of Review and Assessment	30
3.6	Roads with Significantly Changed Traffic Flows	30
3.7	Bus and Coach Stations	30
<b>4</b>	<b>Other Transport Sources</b>	<b>31</b>
4.1	Airports	31
4.2	Railways (Diesel and Steam Trains)	31
4.3	Ports (Shipping)	32
<b>5</b>	<b>Industrial Sources</b>	<b>33</b>
5.1	Industrial Installations	33
5.2	Major Fuel (Petrol) Storage Depots	33
5.3	Petrol Stations	33
5.4	Poultry Farms	34
<b>6</b>	<b>Commercial and Domestic Sources</b>	<b>35</b>
6.1	Biomass Combustion – Individual Installations	35
6.2	Biomass Combustion – Combined Impacts	35
6.3	Domestic Solid-Fuel Burning	35
<b>7</b>	<b>Fugitive or Uncontrolled Sources</b>	<b>36</b>
<b>8</b>	<b>Conclusions and Proposed Actions</b>	<b>37</b>
8.1	Conclusions from New Monitoring Data	37
8.2	Conclusions from Assessment of Sources	37

8.3	Proposed Actions	37
<b>9</b>	<b>Consultation</b>	<b>38</b>
<b>10</b>	<b>References</b>	<b>41</b>

## **Appendices**

Appendix A	Diffusion Tube Locations
Appendix B	QA/QC Data
Appendix C	DMRB Calculations

# 1 Introduction

## 1.1 Description of Local Authority Area

Reigate and Banstead Borough Council is located in Surrey, just to the north of Gatwick Airport and to the South of the London Borough's of Sutton and Croydon. It includes the towns of Reigate, Banstead, Redhill and Horley. There are a number of already identified air quality issues within the borough, relating to both traffic and pollution from Gatwick Airport.

## 1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

## 1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be Achieved by
	Concentration	Measured as	
<b>Benzene</b>	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	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 the first round of review and assessment, potential exceedences of the annual mean nitrogen dioxide air quality objective were identified and a number of AQMAs were declared close to busy roads and to Gatwick Airport. Several of these AQMAs were subsequently revoked, leaving three AQMAs: one beside the M25, one beside the M23, and one in Horley, close to Gatwick Airport.

The Updating and Screening Assessment carried out at the start of the second round of Review and Assessment for Reigate and Banstead in 2003 indicated a further risk of exceeding the annual mean nitrogen dioxide and PM<sub>10</sub> objectives at residential properties at the junction of Rushworth Road and the A217, and recommended a Detailed Assessment for this area.

The Detailed Assessment concluded that an AQMA was required at this location for nitrogen dioxide, but not for PM<sub>10</sub>. It also investigated air quality within current AQMAs and at a number of locations where AQMAs had previously been in place, but which had been subsequently revoked. The most significant conclusions for these locations were that a previously revoked AQMA at the junction of the A23 and Dean Lane should be redeclared, and that the three remaining AQMAs should be retained.

The 2005 Progress Report presented monitoring data for 2004. Nitrogen dioxide concentrations predicted for 2005 from concentrations measured during 2004 within the newly declared Rushworth Road and redeclared Dean Lane AQMAs showed that the annual mean nitrogen dioxide objective would be met. However, the results were close to the objective and a Further Assessment of air quality at these locations was undertaken.

Routine monitoring of nitrogen dioxide concentrations elsewhere within the Borough identified a further three sites where the concentrations were likely to breach the 2005 annual mean objective. These include residential properties at the junction of the A240 Reigate Road and the A2022 Fir Tree Lane (Drift Bridge), along Reigate High Street and Church Street (between the High Street and Bancroft Road) and a property on the A217 near Blackhorse Lane and the M25 junction 8 interchange.

The decision was made to progress to a Detailed Assessment for nitrogen dioxide at Drift Bridge, but to proceed straight to declaration of AQMAs (and thus to a Further Assessment) at Reigate High Street and the A217 Blackhorse Lane.

The Updating and Screening Assessment (2006) concluded that there was a potential exceedence of the annual mean nitrogen dioxide objective in Merstham and a Detailed Assessment was subsequently undertaken along the A23 London Road North. This Detailed Assessment (2007) concluded that an AQMA was required in this location and further monitoring should be undertaken. The Further Assessment subsequently confirmed the need for an AQMA in this location.

Figures 1.1 to 1.9 show the currently declared AQMAs in Reigate and Banstead, which range from individual properties to larger residential areas.

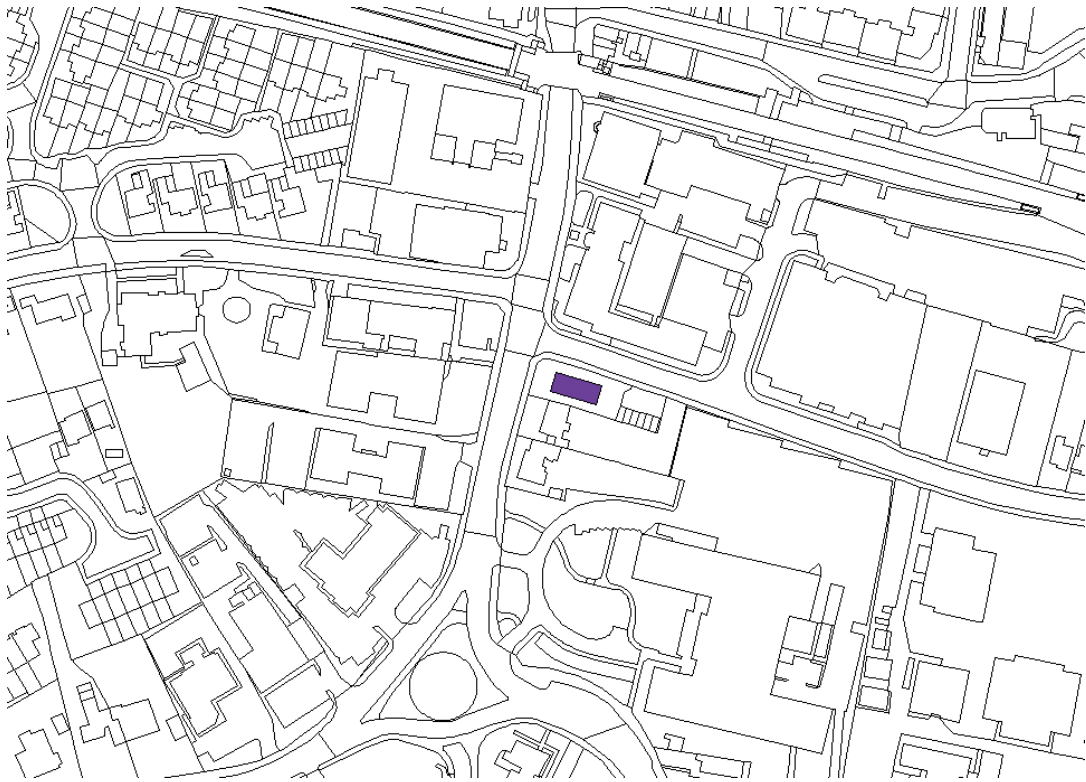




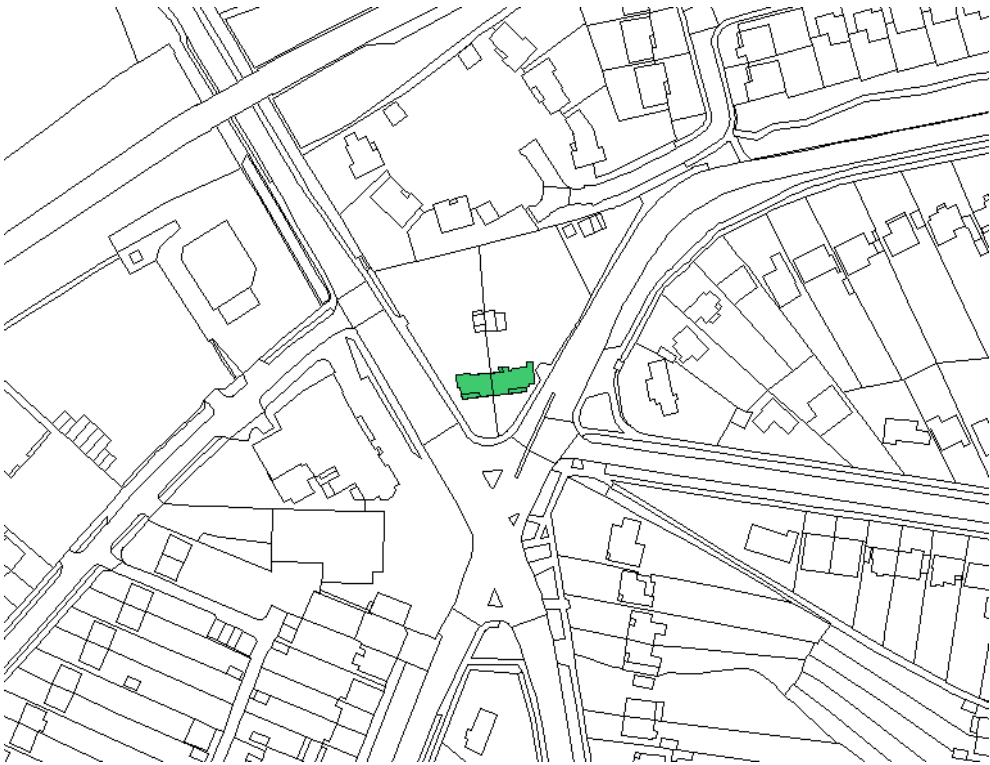
**Figure 1.1. A217 Blackhorse Lane AQMA** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



**Figure 1.2. Dean Lane AQMA** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



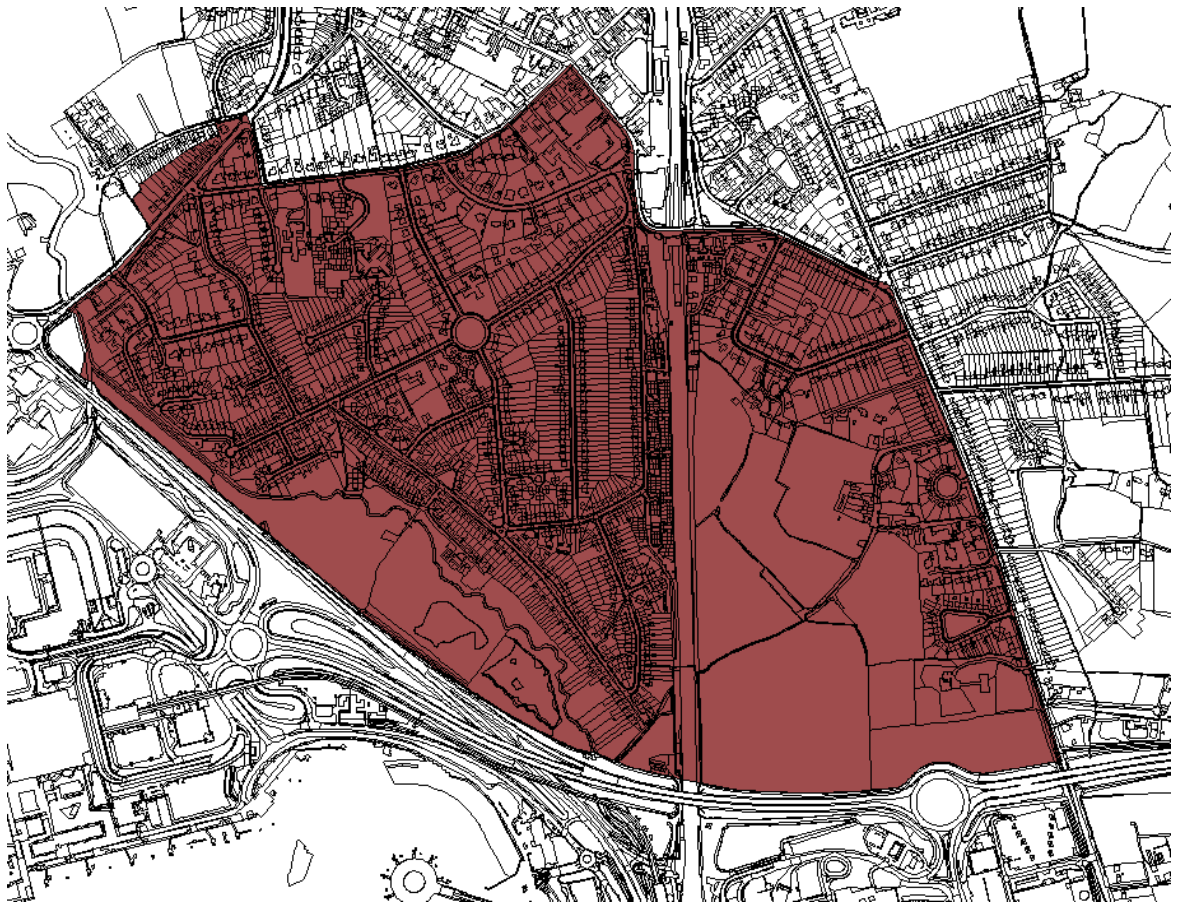
**Figure 1.3. Rushworth Road AQMA** © Crown Copyright. Reigate & Banstead Borough Council.  
Licence no 100019405



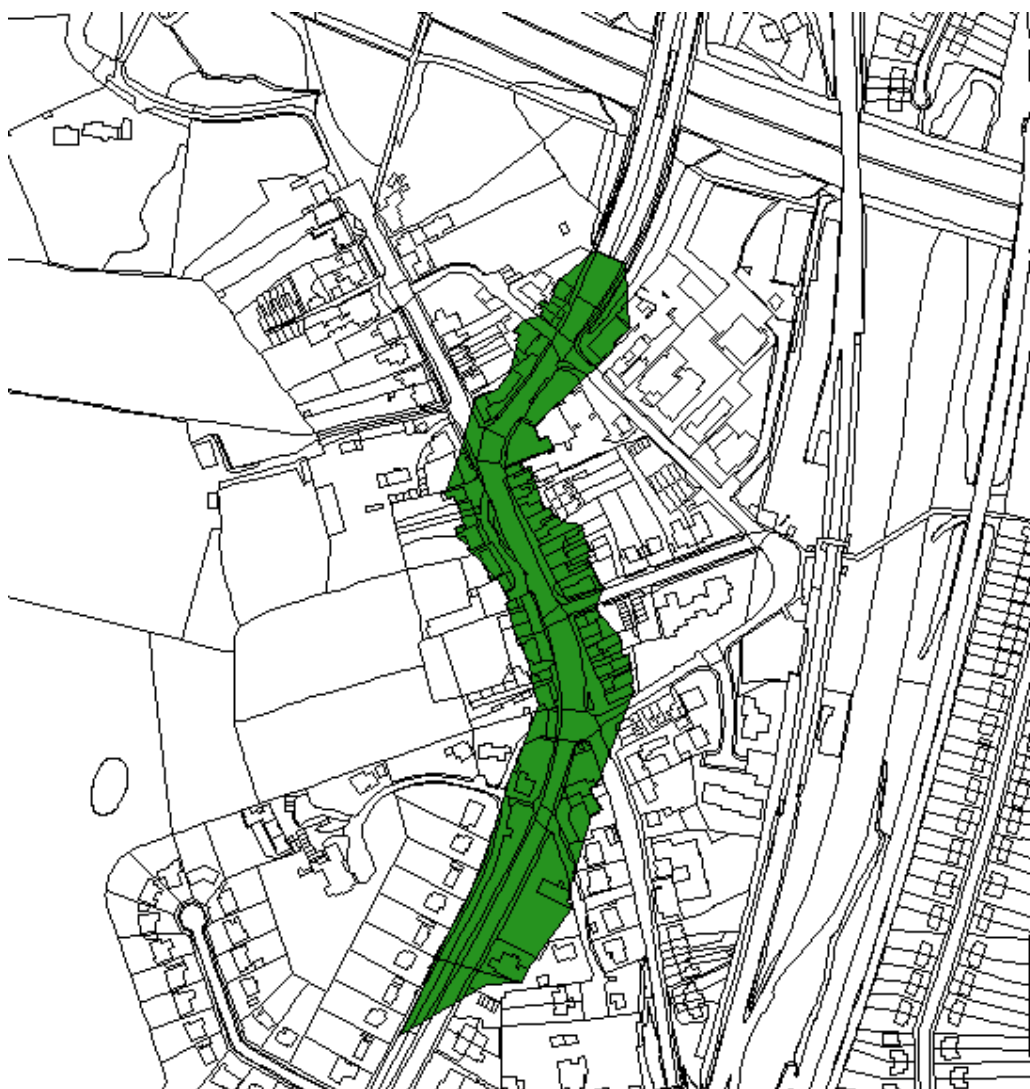
**Figure 1.4. Drift Bridge AQMA** © Crown Copyright. Reigate & Banstead Borough Council.  
Licence no 100019405



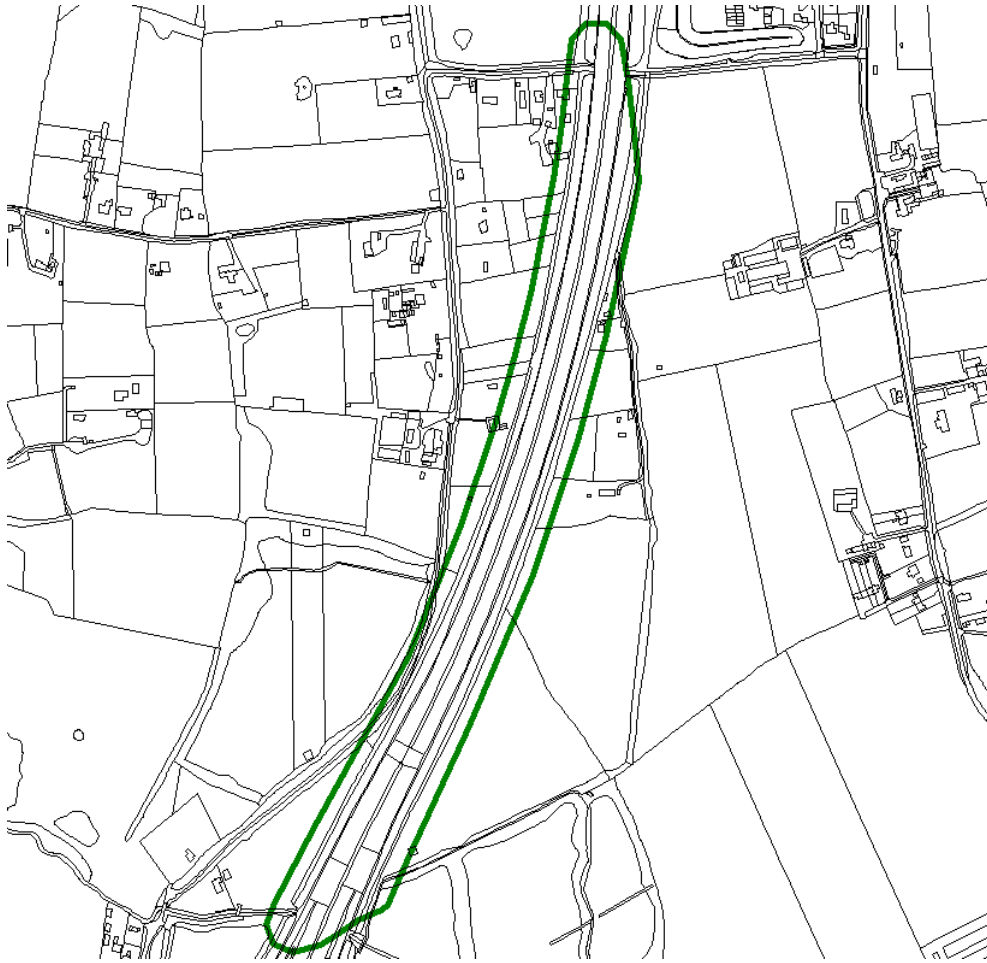
**Figure 1.5. High Street AQMA** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



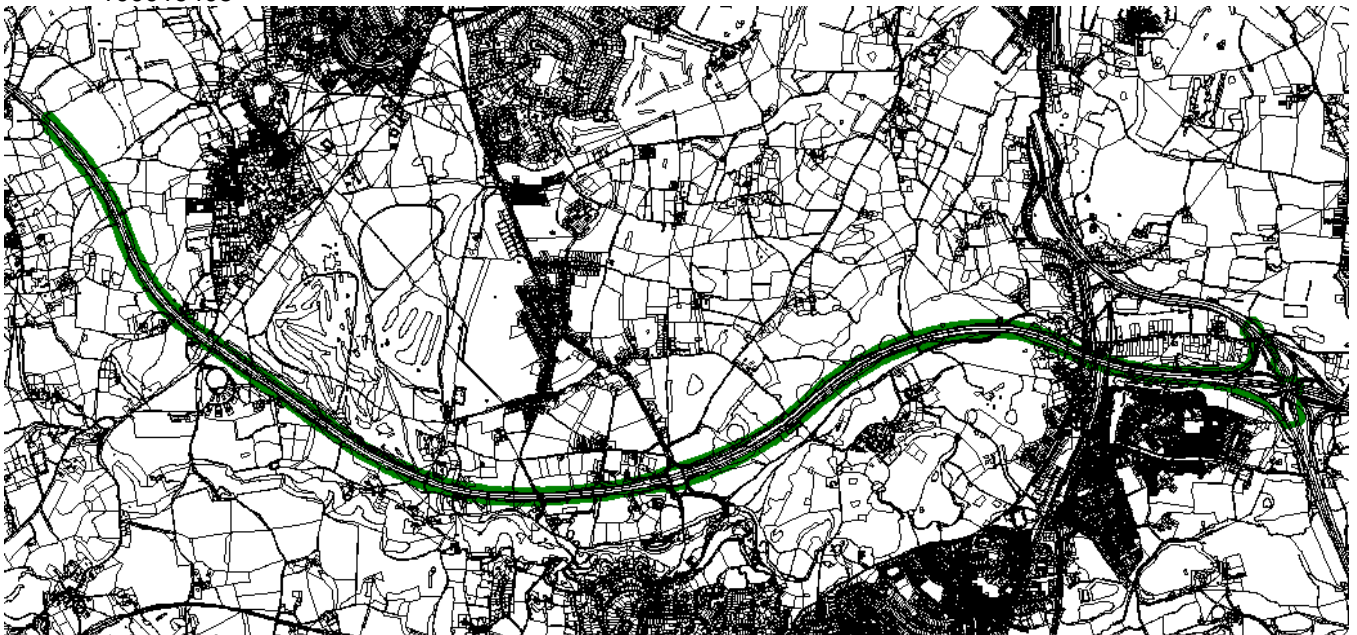
**Figure 1.6. Horley AQMA** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



**Figure 1.7. Merstham AQMA** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



**Figure 1.8. M23 AQMA** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



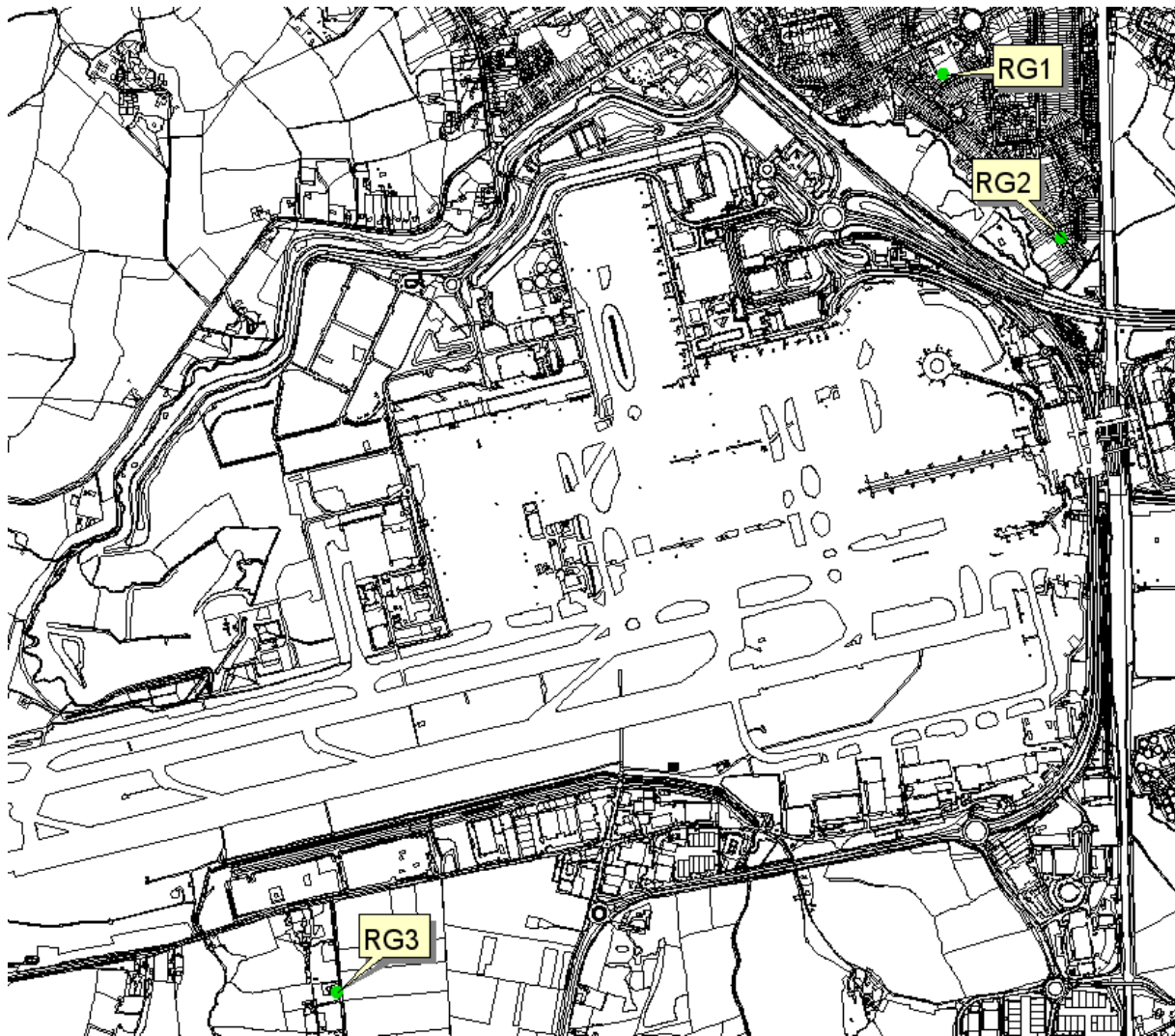
**Figure 1.9. M25 AQMA** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405

## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Reigate and Banstead Borough Council operates three automatic monitors (RG1, RG2 and RG3). The locations are shown in Figure 2.1.



**Figure 2.1. Automatic monitor locations** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405

These are calibrated automatically over night and manually calibrated every 14 days. Data are ratified and verified by ERG. QA/QC is carried out by NPL. There have been no sites started up or closed down since the previous report.

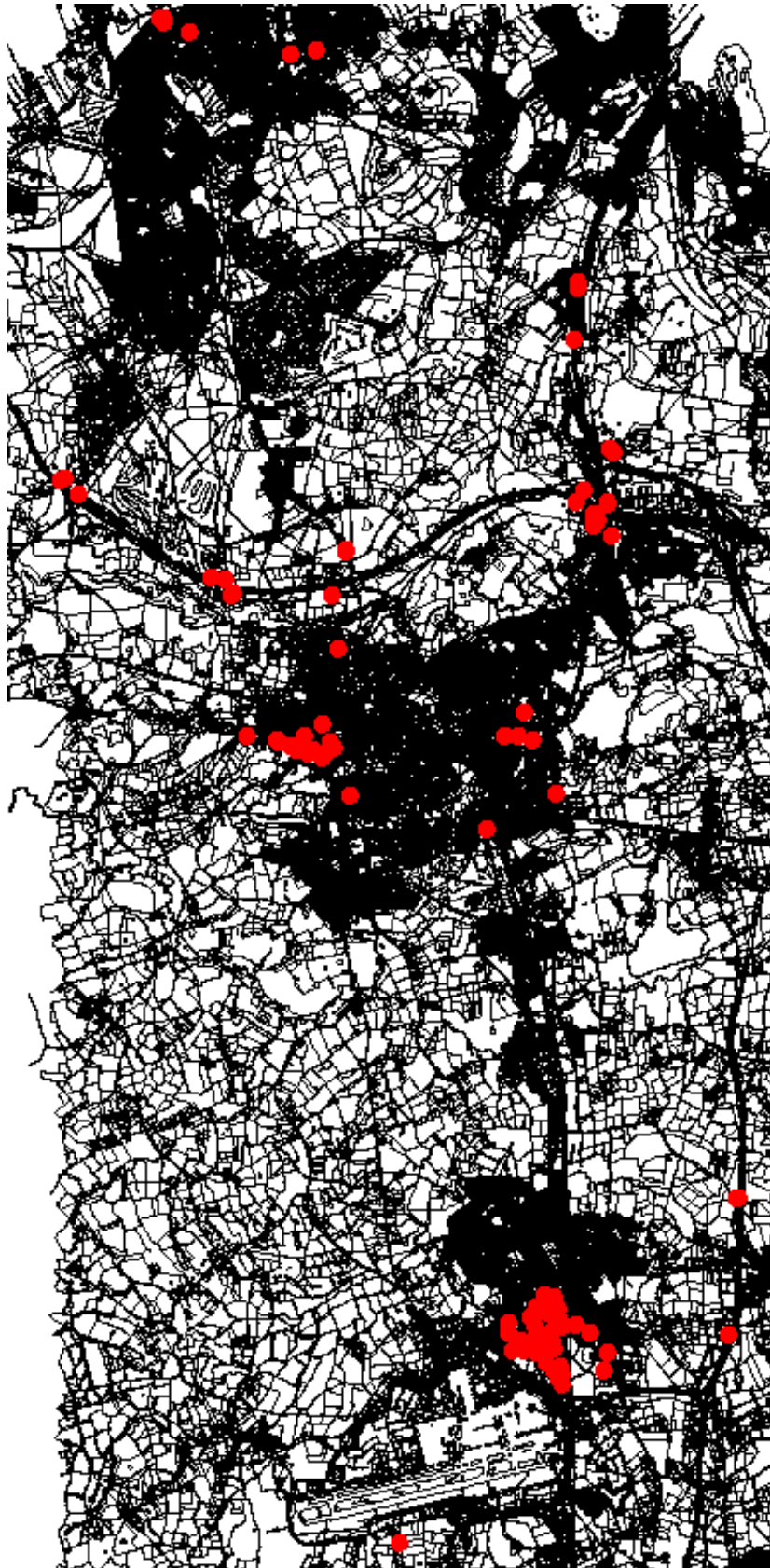
**Table 2.1 Details of Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure?	Distance to Kerb of Nearest Road	Worst-case Location ?
RG 1 - Michael Crescent, Horley	Suburban	528208 142337	NOx PM <sub>10</sub> <sup>1</sup> O <sub>3</sub>	Y	Y	19m	N
RG 2 - 74 The Crescent, Horley	Suburban	528554 141855	NOx	Y	Y	3m	N
RG 3 - Poles Lane Pumping Station, Crawley	Suburban	526420 139638	NOx O <sub>3</sub>	N	Y	11m	N

### 2.1.2 Non-Automatic Monitoring

Reigate and Banstead Borough Council operate 91 diffusion tubes which are shown in Figure 2.2. More detailed maps of diffusion tube locations are included in Appendix A.

<sup>1</sup> Ozone only monitored for 6 months in 2008 as part of a short term study



**Figure 2.2. Distribution of Diffusion Tubes within Reigate and Banstead** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



**Table 2.2 Details of Non- Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to Kerb of Nearest Road	Worst-Case Location? <sup>a</sup>
RB1	Near Road	525246 150252	NO <sub>2</sub>	Y	Y	5.1	N
RB3	Urban Background	524943.89 159629.82	NO <sub>2</sub>	N	N	n/a	n/a
RB8	Intermediate	525246 150286	NO <sub>2</sub>	N	Y	39.5	N
RB9	Urban Background	525750 149677	NO <sub>2</sub>	N	Y	n/a	n/a
RB11	Other - Gatwick	528102.62 142228.33	NO <sub>2</sub>	Y	Y	n/a	n/a
RB12	Kerbside	528424 142934	NO <sub>2</sub>	Y	N	0.4	N
RB13	Intermediate	528362 142983	NO <sub>2</sub>	N	Y	53.7	N
RB17	Urban Background	528511 149715	NO <sub>2</sub>	N	N	n/a	n/a
RB18	Urban Background	529263 153156	NO <sub>2</sub>	N	N	n/a	n/a
RB19	Intermediate	529067 153375	NO <sub>2</sub>	N	N	62.1	N
RB20	Roadside	529026 153420	NO <sub>2</sub>	Y	N	2.8	Y
RB21	Roadside	523198 160095	NO <sub>2</sub>	N	N	1.8	Y
RB22	Intermediate	523260 160111	NO <sub>2</sub>	N	N	21.8	N
RB23	Urban Background	523612 159906	NO <sub>2</sub>	N	N	n/a	n/a
RB24	Background	528208 142337	NO <sub>2</sub>	Y	Y	n/a	n/a
RB25	Background	528208 142337	NO <sub>2</sub>	Y	Y	n/a	n/a
RB26	Background	528208 142337	NO <sub>2</sub>	Y	Y	n/a	n/a
RB27	Roadside (M25)	521873 153896	NO <sub>2</sub>	Y	Y	18.1	Y
RB28	Roadside (M25)	521913 153940	NO <sub>2</sub>	N	Y	76.5	N
RB29	Roadside (M25)	521921 153937	NO <sub>2</sub>	N	Y	80.1	N
RB30	Roadside (M25)	522112 153728	NO <sub>2</sub>	Y	Y	31.1	Y
RB31	Roadside (M25)	525506 152366	NO <sub>2</sub>	N	Y	138.3	N
RB33	Roadside (M25)	524080.85 152579.53	NO <sub>2</sub>	N	Y	58.6	N
RB34	Roadside (M25)	524177 152393	NO <sub>2</sub>	N	Y	64.5	N
RB36	Roadside (M25)	528887 153760	NO <sub>2</sub>	N	Y	76.1	N
RB37	Roadside (M25)	529217 153605	NO <sub>2</sub>	N	Y	68.3	N
RB38	Roadside (M25)	529208 153584	NO <sub>2</sub>	N	Y	46.2	N
RB39	Roadside (M25)	529205 153572	NO <sub>2</sub>	N	Y	34.8	N

RB40	Roadside (M23)	529252 154291	NO <sub>2</sub>	N	Y	26.3	Y
RB41	Roadside (M23)	529293 154281	NO <sub>2</sub>	N	Y	44.1	N
RB42	Roadside	529234 154317	NO <sub>2</sub>	N	N	29.2	Y
RB43	Roadside (M25)	528797 153612	NO <sub>2</sub>	N	Y	50.8	
RB44	Roadside	525532 150316	NO <sub>2</sub>	Y	Y	14.6	Y
RB45	Roadside	525431 150270	NO <sub>2</sub>	Y	N	0	N
RB46	Roadside	525345.93 150240.61	NO <sub>2</sub>	Y	N	0	Y
RB47	Roadside	525114 150276	NO <sub>2</sub>	Y	Y	8.2	N
RB49	Roadside (Near A217)	525705 152947	NO <sub>2</sub>	Y	Y	11.2	Y
RB50	Roadside (Near A217)	525705 152967	NO <sub>2</sub>	N	Y	19.1	N
RB51	Roadside (Horley AQ)	527873 142606	NO <sub>2</sub>	Y	Y	15.2	N
RB52	Roadside (Horley AQ)	527892 142463	NO <sub>2</sub>	Y	Y	14.2	N
RB53	Roadside (Horley AQ)	528030.46 142372.83	NO <sub>2</sub>	Y	N	4.9	N
RB54	Roadside (Horley AQ)	528112.26 142321.37	NO <sub>2</sub>	Y	N	7.2	N
RB55	Roadside (Horley AQ)	528254 142195.55	NO <sub>2</sub>	Y	N	1.4	N
RB56	Roadside (Horley AQ)	528385.82 142080.48	NO <sub>2</sub>	Y	N	2.7	N
RB57	Roadside (Horley AQ)	528498.91 141952.96	NO <sub>2</sub>	Y	N	2.8	N
RB58	Roadside (Horley AQ)	528538.3 141896.96	NO <sub>2</sub>	Y	N	2.6	N
RB59	Other - Airport (Horley AQ)	528602.17 141788.94	NO <sub>2</sub>	Y	N	42.6	Y
RB60	Roadside (Horley AQ)	528607.43 141910.2	NO <sub>2</sub>	Y	N	2.8	Y
RB61	Kerbside (Horley AQ)	528577.52 142005.81	NO <sub>2</sub>	Y	N	1	N
RB64	Urban background (Horley AQ)	528589 142552	NO <sub>2</sub>	Y	Y	18.3	n/a
RB65	Urban background (Horley AQ)	528581 142635	NO <sub>2</sub>	Y	Y	17.1	n/a
RB66	Urban background (Horley AQ)	528499 142512	NO <sub>2</sub>	Y	Y	18.4	n/a
RB67	Urban background (Horley AQ)	528462 142366	NO <sub>2</sub>	Y	Y	16.4	n/a
RB68	Urban background (Horley AQ)	528505 142246	NO <sub>2</sub>	Y	Y	18.7	n/a
RB69	Urban background (Horley AQ)	528335 142224	NO <sub>2</sub>	Y	Y	14.3	n/a
RB70	Urban	528360	NO <sub>2</sub>	Y	Y	17.8	n/a

	background (Horley AQ)	142384					
RB72	Urban background (Horley AQ)	528220 142583	NO <sub>2</sub>	Y	Y	20.5	n/a
RB73	Urban background (Horley AQ)	528172 142679	NO <sub>2</sub>	Y	Y	18.6	n/a
RB74	Urban background (Horley AQ)	529149 141953	NO <sub>2</sub>	Y	N	146.1	n/a
RB75	Urban background (Horley AQ)	529203 142192	NO <sub>2</sub>	Y	Y	20.8	n/a
RB76	Urban background (Horley AQ)	528958 142468	NO <sub>2</sub>	Y	Y	144.1	n/a
RB77	Urban background (Horley AQ)	528789 142570	NO <sub>2</sub>	Y	Y	12.4	n/a
RB78/79/80	Roadside (Horley AQ)	528553.38 141857.47	NO <sub>2</sub>	Y	N	2.6	N
RB81	Roadside	527594 149236	NO <sub>2</sub>	N	Y	5.7	Y
RB82	Suburban (A23 AQMA)	528770 155797	NO <sub>2</sub>	Y	Y	31.2	Y
RB95	Roadside	525381.77 150639.09	NO <sub>2</sub>	Y	Y	5.9	Y
RB98	Other - Airport (Horley AQMA)	527930.64 142230.59	NO <sub>2</sub>	Y	N	n/a	N
RB99/100/101	Other - Airport	526421.2 139638.8	NO <sub>2</sub>	N	Y	n/a	N
RB102	Other - M23	530937.38 144271.9	NO <sub>2</sub>	N	N	42.1	N
RB103	Roadside - A217	525704.22 152951.31	NO <sub>2</sub>	Y	Y	12.0	Y
RB104	Roadside	525203.76 150254.14	NO <sub>2</sub>	Y	Y	4.6	N
RB105	Roadside	525202.97 150239.06	NO <sub>2</sub>	Y	Y	2.8	Y
RB106	Roadside	523249.94 160055.78	NO <sub>2</sub>	Y	Y	2.2	Y
RB107	Roadside	525466.63 150292.04	NO <sub>2</sub>	Y	N	2.4	N
RB109	Roadside	525387.06 150178.37	NO <sub>2</sub>	Y	Y	3.6	Y
RB110	Roadside	529015.78 153438.94	NO <sub>2</sub>	Y	Y	5.0	N
RB111	Roadside	525031.12 150291.07	NO <sub>2</sub>	Y	Y	4.2	Y
RB112	Roadside	524962.6 150332.64	NO <sub>2</sub>	Y	Y	2.0	N
RB113	Roadside	524794.78 150404.21	NO <sub>2</sub>	Y	Y	2.4	N
RB114	Roadside	524368.03 150476.7	NO <sub>2</sub>	N	N	1.5	N
RB115	Roadside	524766.12 150426.78	NO <sub>2</sub>	Y	Y	2.7	N
RB116	Kerbside	525010.94 150320.98	NO <sub>2</sub>	Y	Y	0.6	N

RB117	Roadside	525075.53 150326.73	NO <sub>2</sub>	Y	Y	3.2	Y
RB118	Roadside	525151.22 150467.26	NO <sub>2</sub>	Y	Y	14.2	N
RB119	Roadside	525477.38 150385.72	NO <sub>2</sub>	N	Y	12.7	N
RB120	Roadside	528195.5 150421.4	NO <sub>2</sub>	N	Y	2.7	Y
RB121	Roadside	528092.4 150785.5	NO <sub>2</sub>	N	N	2.1	n/a
RB122	Roadside	528012.7 150474.9	NO <sub>2</sub>	N	N	2.4	N
RB123	Kerbside	527838.5 150473.9	NO <sub>2</sub>	N	N	0.4	N
RB124	Roadside	529013 153285.15	NO <sub>2</sub>	Y	N	4.4	N
RB125	Roadside	525589.1 151654.9	NO <sub>2</sub>	N	N	2.5	Y
RB126	Roadside	525313.8 159671.3	NO <sub>2</sub>	N	N	5.0	N

<sup>a</sup> Locations where concentrations are expected to be the highest (issues such as proximity to junctions, proximity of exposure to the carriageway, levels of congestion, street canyons etc. have been taken into account). This does not apply to background sites.

Reigate and Banstead Borough Council uses diffusion tubes prepared and analysed by Lambeth Scientific Services (50% TEA in acetone). Results from the WASP scheme<sup>2</sup> show acceptable performance for Lambeth Scientific Services, however the laboratory precision is poor overall (precision spreadsheet 05/09<sup>3</sup>). The Council operates three co-location studies at the automatic sites. The 2008 local bias correction factor for Lambeth is 1.02. All 2008 data have been adjusted using this figure.

## 2.2 Comparison of Monitoring Results with AQ Objectives

### 2.2.1 Nitrogen Dioxide

#### Automatic Monitoring Data

The nitrogen dioxide results measured by the automatic monitor (Tables 2.3a and 2.3b) show that the annual mean and the hourly mean objectives have been met.

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

Site ID	Location	Within AQMA?	Proportion of Year with Valid Data 2008 %	Annual Mean Concentrations (µg/m <sup>3</sup> )		
				2006	2007	2008
RG 1	RG 1 - Michael Crescent, Horley	Y	99.4	29.3	28.8	26.9
RG 2	RG 2 - 74 The Crescent, Horley	Y	92.8	32.4	33.7	32.5

<sup>2</sup> The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL).

<sup>3</sup> Diffusion Tube Precision Summary 2007 – 2008 available at <http://www.uwe.ac.uk/aqm/review/mR&Asupport09.html#Bias%20Adjustment>

RG 3	RG 3 - Poles Lane Pumping Station, Crawley	N	99.2	19.4	20.8	18.9
<b>Objective</b>				<b>40</b>	<b>40</b>	<b>40</b>

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

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of Hourly Mean ( $200 \mu\text{g}/\text{m}^3$ )		
				2006	2007	2008
RG 1	RG 1 - Michael Crescent, Horley	Y	99.4	0	0	0
RG 2	RG 2 - 74 The Crescent, Horley	Y	92.8	0	0	0
RG 3	RG 3 - Poles Lane Pumping Station, Crawley	N	99.2	0	0	0
<b>Objective</b>				<b>18</b>	<b>18</b>	<b>18</b>

## Diffusion Tube Monitoring Data

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual Mean Concentrations 2008 ( $\mu\text{g}/\text{m}^3$ ) Adjusted for bias
<b>Reigate</b>				
RB8	Urban Background: Castle Walk, Reigate	N	100	24.6
RB9	Urban Background: St. Mary's Rd	N	100	22.9
RB 125	Lamp post 29, Opposite Reigate Hill Close, Reigate Hill	N	100	<b>43.9</b>
RB114	Sign Post, 87 West Street, Reigate	N	91.7	30.6
RB119 <sup>a</sup>	Drainpipe, Castlefield Road, Reigate	N	83.9	26.1
<b>Reigate AQMA</b>				
RB115	Lamppost, 36 West Street, Reigate	Y	100	<b>45.4</b>
RB113	Lamppost opposite Newbury Road	Y	100	35.1
RB112	Lamppost, 21 West Street, Reigate	Y	91.7	<b>40.4</b>
RB116	Lamppost, 12 West Street, Reigate.	Y	100	<b>45.4</b>
RB111	Drainpipe, 1 West Street, Reigate	Y	100	<b>40.3</b>
RB109	Drainpipe, 27a Bell Street, Reigate	Y	91.7	38.8
RB117	Drainpipe, 8 London Road, Reigate	Y	91.7	<b>52.2</b>
RB118	Drainpipe, Burlington Place, Reigate	Y	100	<b>40.9</b>
RB47	Outside 78 High St, Reigate	Y	91.7	<b>50.3</b>
RB104	Drainpipe, High Street, Reigate	Y	100	<b>48.3</b>
RB105	Drainpipe, High Street, Reigate	Y	91.7	<b>55.3</b>
RB1	34-36 High Street, Reigate	Y	91.7	<b>40.1</b>
RB46	Signpost, 5 High St, Reigate	Y	100	<b>43.9</b>
RB45	Signpost outside 38 Church St, Reigate	Y	83.9	<b>41.0</b>
RB107	Drainpipe, 29 Church Street, Reigate	Y	100	<b>34.9</b>
RB44	Lamppost, 45 Church St, Reigate	Y	100	<b>43.6</b>
<b>Redhill</b>				
RB17	Urban Background: Sylvan Way, Redhill	N	100	21.9
RB120	Lamp post Outside 21, Redstone Hill Redhill	N	100	<b>41.9</b>
RB121	Lamp Post 271, Opposite Ladbrook Grove, Redhill	N	100	<b>47.0</b>
RB122	Roundabout Sign 5158 near Carpark, Marketfield Way, Redhill	N	91.7	<b>46.5</b>
RB123	Lamp post 3, outside Age Concern Cromwell Road, Redhill	N	100	<b>43.4</b>
<b>Merstham</b>				
RB18	Lamppost, 60 Brook Road, Merstham	N	100	30.5
RB19	Merstham Village Hall, Station Road	N	100	26.0
<b>Merstham AQMA</b>				
RB20	Junction London Road & Station Road North	Y	100	<b>43.1</b>
RB110	Drain Pipe, London Road North, opp. RB20	Y	100	39.4
RB124	Lamppost, 22 High Street, Merstham	Y	91.7	<b>48.1</b>
<b>Banstead</b>				

RB3	Nr Ambulance Station, Horseshoe, Banstead	N	100	24.1
RB23	Urban Bkgrd: Warren Mead School, Banstead	N	100	21.4
RB126	Lamp post 5, Opposite NatWest Banstead High Street.	N	100	38.7
	<b>Drift Bridge</b>			
RB21	Opp. Drift Bridge Hotel, Reigate Road, Banstead	N	100	<b>44.7</b>
RB22	Opposite 2 Grey Alders, Banstead	N	100	22.5
	<b>Drift Bridge AQMA</b>			
RB106	On one way sign, Crossways, Fir Tree Road	Y	100	<b>41.6</b>
	<b>Horley</b>			
RB13	Public Car Park, off Massetts Road, Horley	N	100	25.9
	<b>Horley AQMA</b>			
RB11	RB11: Riverside	Y	100	26.9
RB12	Horley Police Station, Massetts Road, Horley	Y	100	32.7
RB24,25,26	Urban Background Michael Crescent	Y	100	25.2
RB51	Wolverton Gardens	Y	100	29.6
RB52	Wolverton Gardens	Y	100	28.8
RB53	Cheyne Walk	Y	100	32.6
RB54	Crescent Way	Y	100	32.3
RB55	Crescent Way	Y	100	31.0
RB56	The Crescent	Y	100	30.9
RB57	The Crescent	Y	100	31.5
RB58	The Crescent	Y	100	31.9
RB59	The Crescent	Y	100	35.1
RB60	The Crescent	Y	100	36.3
RB61	The Crescent	Y	100	31.8
RB64	The Drive	Y	100	30.2
RB65	The Drive	Y	100	30.8
RB66	Fairfield Avenue	Y	100	28.6
RB67	Fairfield Avenue	Y	100	27.1
RB68	Fairfield Avenue	Y	100	29.4
RB69	Upfield	Y	83.3	29.2
RB70	Upfield	Y	100	29.2
RB72	Upfield	Y	100	28.2
RB73	Upfield	Y	100	29.8
RB74	Meadowcroft Close	Y	100	30.7
RB75	Roundabout, The Coronet	Y	100	26.2
RB76	Limes Avenue	Y	100	25.3
RB77	Staffords Place	Y	91.7	25.8
RB78,79,80	The Crescent	Y	100	33.3
RB98	16/17 Woodroyd Gardens	Y	100	32.6
	<b>Crawley</b>			
RB99, 100, 101	Rural: Poles Lane Pumping Station, Crawley	N	100	20.0
	<b>M23 North (Former AQMA)</b>			
RB40	Shepherd's Hill, Merstham	N	100	24.1
RB41	Shepherd's Hill, Merstham	N	100	19.0
RB42	Kerbside: Shepherd's Hill, Merstham	N	100	36.2

	<b>A23 Brighton Road (Former AQMA)</b>			
RB81	Outside Flying Scud PH, Brighton Road, Redhill	N	100	35.2
	<b>A23 Dean Lane AQMA</b>			
RB82	Outside 1 Deans Lane Hooley	Y	100	38.7
	<b>M23 South AQMA</b>			
RB102	Field near Bridleway, Hathersham Farm, Horley	N	100	26.0
	<b>A217 Rushworth Road AQMA</b>			
RB95	Rushworth Road	Y	100	33.5
	<b>A217 Blackhorse Lane</b>			
RB50	Just off Brighton Road	N	100	34.1
	<b>A217 Blackhorse Lane AQMA (North J8 M25)</b>			
RB49	Kerbside: Brighton Road	Y	100	<b>57.8</b>
RB103	Building façade, Brighton Road	Y	100	<b>41.1</b>
	<b>M25</b>			
RB28	Sturts Lane, Walton on the Hill	N	100	31.3
RB29	Sturts Lane, Walton on the Hill	N	100	32.3
RB31	Reigate Hill	N	100	24.1
RB33	Margery Grove, Mogodor	N	100	29.6
RB34	Merrywood Grove, Mogodor	N	100	26.7
RB36	Gatton Bottom	N	100	25.9
RB37	Ashcombe Road, Merstham	N	100	26.0
RB38	Ashcombe Road, Merstham	N	91.7	30.2
RB39	Ashcombe Road, Merstham	N	100	31.5
RB43	Quality Street, Merstham	N	100	24.1
	<b>M25 AQMA</b>			
RB27	Sturts Lane, Walton on the Hill	Y	100	38.3
RB30	Chequers Lane, Walton on the Hill	Y	100	32.3
<b>Objective</b>				<b>40</b>

<sup>a</sup> Two values excluded due to abnormally low values.



**Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes**

Site ID	Location	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) Adjusted for bias		
			2006 <sup>a</sup>	2007 <sup>b</sup>	2008 <sup>c</sup>
	<b>Reigate</b>				
RB8	Urban Background: Castle Walk, Reigate	N	25.7	27.7	24.6
RB9	Urban Background: St. Mary's Rd	N	25.6	26.0	22.9
RB 125 <sup>d</sup>	Lamp post 29, Opposite Reigate Hill Close, Reigate Hill	N	-	<b>54.9</b>	<b>43.9</b>
RB114	Sign Post, 87 West Street, Reigate	N	37.0	37.0	30.6
RB119	Drainpipe, Castlefield Road, Reigate	N	36.2	36.7	26.1
	<b>Reigate AQMA</b>				
RB115	Lamppost, 36 West Street, Reigate	Y	<b>55.0</b>	<b>43.2</b>	<b>45.4</b>
RB113	Lamppost opposite Newbury Road	Y	39.3	36.4	35.1
RB112	Lamppost, 21 West Street, Reigate	Y	<b>40.9</b>	<b>40.8</b>	<b>40.4</b>
RB116	Lamppost, 12 West Street, Reigate.	Y	<b>65.3</b>	<b>46.9</b>	<b>45.4</b>
RB111	Drainpipe, 1 West Street, Reigate	Y	<b>49.3</b>	<b>40.0</b>	<b>40.3</b>
RB109	Drainpipe, 27a Bell Street, Reigate	Y	<b>50.8</b>	<b>46.5</b>	38.8
RB117	Drainpipe, 8 London Road, Reigate	Y	<b>73.8</b>	<b>51.5</b>	<b>52.2</b>
RB118	Drainpipe, Burlington Place, Reigate	Y	<b>59.6</b>	<b>38.4</b>	<b>40.9</b>
RB47	Outside 78 High St, Reigate	Y	<b>62.4</b>	<b>54.5</b>	<b>50.3</b>
RB104	Drainpipe, High Street, Reigate	Y	<b>47.0</b>	<b>49.3</b>	<b>48.3</b>
RB105	Drainpipe, High Street, Reigate	Y	<b>60.0</b>	<b>54.2</b>	<b>55.3</b>
RB1	34-36 High Street, Reigate	Y	<b>48.1</b>	<b>44.2</b>	<b>40.1</b>
RB46	Signpost, 5 High St, Reigate	Y	<b>61.0</b>	<b>43.5</b>	<b>43.9</b>
RB45	Signpost outside 38 Church St, Reigate	Y	<b>49.8</b>	<b>44.4</b>	<b>41.0</b>
RB107	Drainpipe, 29 Church Street, Reigate	Y	39.7	38.7	34.9
RB44	Lamppost, 45 Church St, Reigate	Y	<b>50.4</b>	<b>46.8</b>	<b>43.6</b>
	<b>Redhill</b>				
RB17	Urban Background: Sylvan Way, Redhill	N	24.9	29.6	21.9
RB120 <sup>d</sup>	Lamp post Outside 21, Redstone Hill Redhill	N	-	<b>51.1</b>	<b>41.9</b>
RB121 <sup>d</sup>	Lamp Post 271, Opposite Ladbrook Grove, Redhill	N	-	<b>47.6</b>	<b>47.0</b>
RB122 <sup>d</sup>	Roundabout Sign 5158 near Carpark, Marketfield Way, Redhill	N	-	38.7	<b>46.5</b>
RB123 <sup>d</sup>	Lamp post 3, outside Age Concern Cromwell Road, Redhill	N	-	<b>48.6</b>	<b>43.4</b>
	<b>Merstham</b>				
RB18	Lamppost, 60 Brook Road, Merstham	N	34.8	32.7	30.5
RB19	Merstham Village Hall, Station Road	N	33.0	31.6	26.0
	<b>Merstham AQMA</b>				
RB20	Junction London Road & Station Road North	Y	<b>47.8</b>	<b>47.0</b>	<b>43.1</b>
RB110	Drain Pipe, London Road North, opp. RB20	Y	<b>43.8</b>	<b>41.8</b>	39.4
RB124 <sup>d</sup>	Lamppost, 22 High Street, Merstham	Y	-	<b>55.9</b>	<b>48.1</b>

	<b>Banstead</b>				
RB3	Nr Ambulance Station, Horseshoe, Banstead	N	26.6	25.9	24.1
RB23	Urban Bkgrd: Warren Mead School, Banstead	N	23.0	22.8	21.4
RB126 <sup>d</sup>	Lamp post 5, Opposite NatWest Banstead High Street.	N	-	<b>42.5</b>	38.7
	<b>Drift Bridge</b>				
RB21	Opp. Drift Bridge Hotel, Reigate Road, Banstead	N	<b>51.6</b>	<b>46.9</b>	<b>44.7</b>
RB22	Opposite 2 Grey Alders, Banstead	N	28.8	31.4	22.5
	<b>Drift Bridge AQMA</b>				
RB106	On one way sign, Crossways, Fir Tree Road	Y	<b>47.5</b>	39.2	<b>41.6</b>
	<b>Horley</b>				
RB13	Public Car Park, off Massetts Road, Horley	N	32.7	27.4	25.9
	<b>Horley AQMA</b>				
RB11	RB11: Riverside	Y	27.9	27.2	26.9
RB12	Horley Police Station, Massetts Road, Horley	Y	<b>41.1</b>	36.7	32.7
RB24,25,26	Urban Background Michael Crescent	Y	27.7	27.8	25.2
RB51	Wolverton Gardens	Y	31.5	27.2	29.6
RB52	Wolverton Gardens	Y	33.7	29.5	28.8
RB53	Cheyne Walk	Y	36.9	34.7	32.6
RB54	Crescent Way	Y	33.1	31.0	32.3
RB55	Crescent Way	Y	34.9	33.7	31.0
RB56	The Crescent	Y	32.1	30.7	30.9
RB57	The Crescent	Y	34.7	35.1	31.5
RB58	The Crescent	Y	34.2	35.9	31.9
RB59	The Crescent	Y	37.2	38.5	35.1
RB60	The Crescent	Y	<b>40.5</b>	38.7	36.3
RB61	The Crescent	Y	36.7	34.0	31.8
RB64	The Drive	Y	33.3	30.0	30.2
RB65	The Drive	Y	35.9	33.7	30.8
RB66	Fairfield Avenue	Y	33.3	30.0	28.6
RB67	Fairfield Avenue	Y	31.3	31.4	27.1
RB68	Fairfield Avenue	Y	32.2	31.3	29.4
RB69	Upfield	Y	33.0	30.2	29.2
RB70	Upfield	Y	33.9	31.3	29.2
RB72	Upfield	Y	30.7	28.1	28.2
RB73	Upfield	Y	31.5	27.8	29.8
RB74	Meadowcroft Close	Y	28.8	26.6	30.7
RB75	Roundabout, The Coronet	Y	31.6	34.6	26.2
RB76	Limes Avenue	Y	27.3	27.3	25.3
RB77	Staffords Place	Y	30.3	31.4	25.8
RB78,79,80	The Crescent	Y	32.4	36.6	33.3
RB98	16/17 Woodroyd Gardens	Y	35.5	34.4	32.6

	<b>Crawley</b>				
RB99, 100, 101	Rural: Poles Lane Pumping Station, Crawley	N	20.1	20.5	20.0
	<b>M23 North (Former AQMA)</b>				
RB40	Shepherd's Hill, Merstham	N	28.6	28.1	24.1
RB41	Shepherd's Hill, Merstham	N	26.8	25.5	19.0
RB42	Kerbside: Shepherd's Hill, Merstham	N	<b>42.1</b>	38.5	36.2
	<b>A23 Brighton Road (Former AQMA)</b>				
RB81	Outside Flying Scud PH, Brighton Road, Redhill	N	36.7	<b>40.9</b>	35.2
	<b>A23 Dean Lane AQMA</b>				
RB82	Outside 1 Deans Lane Hooley	Y	39.7	<b>40.3</b>	38.7
	<b>M23 South AQMA</b>				
RB102	Field near Bridleway, Hathersham Farm, Horley	Y	29.2	28.4	26.0
	<b>A217 Rushworth Road AQMA</b>				
RB95	Rushworth Road	Y	33.6	36.5	33.5
	<b>A217 Blackhorse Lane</b>				
RB50	Just off Brighton Road	N	<b>40.9</b>	<b>39.8</b>	34.1
	<b>A217 Blackhorse Lane AQMA (North J8 M25)</b>				
RB49	Kerbside: Brighton Road	Y	<b>62.7</b>	<b>55.1</b>	<b>57.8</b>
RB103	Building façade, Brighton Road	Y	<b>45.7</b>	39.3	<b>41.1</b>
	<b>M25</b>				
RB28	Sturts Lane, Walton on the Hill	N	36.1	32.2	31.3
RB29	Sturts Lane, Walton on the Hill	N	37.6	36.2	32.3
RB31	Reigate Hill	N	25.8	30.7	24.1
RB33	Margery Grove, Mogodor	N	37.7	28.8	29.6
RB34	Merrywood Grove, Mogodor	N	23.9	29.9	26.7
RB36	Gatton Bottom	N	33.9	29.3	25.9
RB37	Ashcombe Road, Merstham	N	32.2	29.3	26.0
RB38	Ashcombe Road, Merstham	N	36.7	33.4	30.2
RB39	Ashcombe Road, Merstham	N	35.3	33.7	31.5
RB43	Quality Street, Merstham	N	31.2	38.4	24.1
	<b>M25 AQMA</b>				
RB27	Sturts Lane, Walton on the Hill	Y	39.3	37.3	38.3
RB30	Chequers Lane, Walton on the Hill	Y	<b>40.2</b>	35.7	32.3
	<b>Objective</b>		<b>40</b>	<b>40</b>	<b>40</b>

<sup>a</sup> Bias adjusted using a local factor of 1.46 in 2006

<sup>b</sup> Bias adjusted using a local factor of 1.145 in 2007

<sup>c</sup> Bias adjusted using a local factor of 1.02 in 2008

<sup>d</sup> 2007 data available for June to December, annual adjustment factor or 1.02 applied (Appendix B).

The nitrogen dioxide results measured by diffusion tubes displayed in Table 2.4a and 2.4b show that the annual mean objective has been met at the majority of locations within Reigate and Banstead. A

substantial number of locations within the AQMAs are, however, still showing exceedences. In addition, a number of new sites not currently in AQMAs have concentrations above the objective. In Banstead, RB21 is currently showing exceedences, but is not located within an AQMA. This site is not representative of exposure, and therefore a Detailed Assessment will not be required. In Redhill, there are 4 monitoring locations showing exceedences and it is proposed that a Detailed Assessment is carried out covering Redhill, examining relevant exposure in detail. In addition, the diffusion tube on Reigate Hill (RB125) is showing exceedences. This has been extrapolated back to the façade of the nearest property using the NO<sub>2</sub> with distance fall off calculator<sup>4</sup> and exceedences are still likely (monitoring location 2.5m from the kerb; property 5m from the kerb; NO<sub>2</sub> background 29 µg/m<sup>3</sup>; monitored concentration 43.9 µg/m<sup>3</sup>; projected concentration 41.3 µg/m<sup>3</sup>). For this location, a Detailed Assessment is also required. It should be noted that some of the AQMAs have no measured exceedences of the annual mean objective.

## 2.2.2 PM<sub>10</sub>

Reigate and Banstead Borough Council operates one automatic monitor (RG1) located at Michael Crescent, Horley which measures PM<sub>10</sub> (Tables 2.5a and 2.5b). The results for 2008 have also been corrected using the Volatile Correction Model to provide a more accurate estimate of the gravimetric concentration.

**Table 2.5a Results of PM<sub>10</sub> Automatic Monitoring: Comparison with Annual Mean Objective**

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual Mean Concentrations (µg/m <sup>3</sup> )		
				2006	2007	2008
RG 1	RG 1 - Michael Crescent, Horley	N	99	23.8 <sup>a</sup>	23.3 <sup>a</sup>	19.7 <sup>b</sup>
<b>Objective</b>				<b>40</b>	<b>40</b>	<b>40</b>

<sup>a</sup> TEOM data has been corrected using the default 1.3 correction factor to estimate gravimetric concentrations.

<sup>b</sup> Corrected using Volatile Correction Model (<http://www.volatile-correction-model.info>)

**Table 2.5b Results of PM<sub>10</sub> Automatic Monitoring: Comparison with 24-hour Mean Objective**

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of Daily Mean (50 µg/m <sup>3</sup> )		
				2006	2007	2008
RG 1	RG 1 - Michael Crescent, Horley	N	99	5 <sup>a</sup>	9 <sup>a</sup>	5 <sup>b</sup>
<b>Objective</b>				<b>35</b>	<b>35</b>	<b>35</b>

<sup>a</sup> TEOM data has been corrected using the default 1.3 correction factor to estimate gravimetric concentrations.

<sup>b</sup> Corrected using Volatile Correction Model (<http://www.volatile-correction-model.info>)

## 2.2.3 Benzene

Monitoring of Benzene concentrations takes place using BTEX tubes exposed monthly at three locations within the Borough. These tubes are located at roadside locations in Reigate High Street and London Road, Merstham, and Riverside, Horley. Annual mean concentrations are presented in Table 2.6. The measured annual mean benzene concentrations are well below the 2010 air quality objective at all monitored locations.

<sup>4</sup> <http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls>

**Table 2.6: Results of Benzene Monitoring: Comparison with Annual Mean Objective**

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual Mean Concentrations ( $\mu\text{g}/\text{m}^3$ )		
				2006	2007	2008
RB1	High Street, Reigate	N	92	2.68	2.46	3.04
RB11	Riverside, Horley	N	100	2.54	2.46	2.33
RB20	London Road, Merstham	N	100	2.19	2.21	2.93
<b>Objective</b>				<b>5</b>	<b>5</b>	<b>5</b>

## 2.2.4 Ozone

Reigate and Banstead Borough Council operates two ozone monitoring sites. The monitoring site at Michael Crescent, Horley began monitoring ozone in 2008. Although there is no requirement to assess ozone within the Updating and Screening Assessment, these data are included for completeness.

**Table 2.7a Results of Ozone Automatic Monitoring: Annual Mean Concentrations**

Location	Within AQMA?	Data Capture 2008 %	Annual Mean Concentrations <sup>a</sup> ( $\mu\text{g}/\text{m}^3$ )		
			2006	2007	2008
RG 1 - Michael Crescent, Horley	N	50.5	n/a	n/a	47.6 <sup>5</sup>
RG 3 - Poles Lane Pumping Station, Crawley	N	99.2	53.6	44.8	51.1

**Table 2.7b Results of Ozone Automatic Monitoring: Comparison with 8-hour Mean Objective**

Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of 8 Hour Mean ( $100 \mu\text{g}/\text{m}^3$ )		
			2006	2007	2008
RG 1 - Michael Crescent, Horley	N	50.5	n/a	n/a	32
RG 3 - Poles Lane Pumping Station, Crawley	N	99.2	35	21	41
<b>Objective</b>			<b>10</b>	<b>10</b>	<b>10</b>

## 2.2.5 Other pollutants monitored

Reigate and Banstead Borough Council does not carry out monitoring of any other pollutants.

<sup>5</sup> Ozone only monitored at RG1 for 6 months as part of a short term study

The results from monitoring in the Borough have shown that concentrations of PM<sub>10</sub> and benzene are below the objective values. The nitrogen dioxide results show that the annual mean objective has been met at the majority of locations within Reigate and Banstead. A substantial number of locations within the Air Quality Management Areas (AQMAs) are, however, still showing exceedences. In addition, a number of new sites not currently in AQMAs have concentrations above the objective. In Redhill, there are 4 monitoring locations showing exceedences and it is proposed that a Detailed Assessment is carried out covering Redhill, examining relevant exposure in detail. In addition, the diffusion tube on Reigate Hill is also showing exceedences. This has been extrapolated back to the façade of the nearest property and exceedences are still likely at the façade of the nearest property. A Detailed Assessment is also required for this location.

## **3 Road Traffic Sources**

### **3.1 Narrow Congested Streets with Residential Properties Close to the Kerb**

The criteria for assessing narrow congested streets are set out in Box 5.3, section A1 of TG(09). The traffic flow required to trigger a Detailed Assessment has reduced since the last Updating and Screening Assessment from 10,000 vpd to 5,000 vpd. There are no further known locations, which are not already covered by AQMAs which would be included within these criteria.

Reigate and Banstead Borough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

### **3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic**

The criteria for assessing busy streets relevant for the hourly nitrogen dioxide objective are set out in Box 5.3, section A2 of TG(09) and are unchanged from previous rounds of Review and Assessment. Busy streets where people may spend 1-hour or more close to traffic were considered in previous Updating and Screening Assessments and no such locations identified. All of the diffusion tube sites currently have concentrations below  $60 \mu\text{g}/\text{m}^3$  and hence it is unlikely that the hourly objective will be exceeded at any of the sites in Reigate and Banstead currently being monitored.

Reigate and Banstead Borough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

### **3.3 Roads with a High Flow of Buses and/or HGVs.**

The criteria for assessing roads with high flows of buses and/ or HGVs are set out in Box 5.3, section A3 of TG(09) and are unchanged from previous rounds of Review and Assessment. Roads with high flows of buses and/ or HGVs were considered in previous Updating and Screening Assessments and no such locations identified.

Reigate and Banstead Borough Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

### **3.4 Junctions**

The criteria for assessing junctions are set out in Box 5.3, section A4 of TG(09) and are unchanged from previous rounds of Review and Assessment. Junctions were considered in detail in previous Updating and Screening Assessments and where relevant have been included in Detailed Assessments and subsequent AQMA declarations. The junction of the A23 with Maple Road has been identified as a potential issue and DMRB has been used to assess concentrations at the properties on the west side of

the A23 to the south of the junction. There are no monitoring data in the vicinity with which to verify the DMRB, but worst-case assumptions have been made, and predicted concentrations are well below the relevant objectives at the worst-case receptors. Assumptions, input data and results are included in Appendix C. It is concluded that a Detailed Assessment is not required for this location. The A23 in Hooley has also been identified as a potential issue. Monitoring (diffusion tubes) was put in place at the beginning of 2009 and it is proposed that the data from these monitoring sites are examined within the 2010 Progress Report, at which point, conclusions will be drawn on whether a Detailed Assessment is required.

Reigate and Banstead Borough Council has assessed one newly identified junction at the A23 and Maple Road, and concluded that it will not be necessary to proceed to a Detailed Assessment. One further location (Hooley) is currently undergoing monitoring which will be reported in the 2010 Progress Report.

### **3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment**

The criteria for assessing new roads are set out in Box 5.3, section A5 of TG(09) and are unchanged from previous rounds of Review and Assessment.

Reigate and Banstead Borough Council confirms that there are no new/proposed roads.

### **3.6 Roads with Significantly Changed Traffic Flows**

The criteria for assessing roads with significantly changed traffic flows are set out in Box 5.3, section A6 of TG(09) and are unchanged from previous rounds of Review and Assessment. In the last three years, there have been no significant changes in traffic flows on roads in Reigate and Banstead.

Reigate and Banstead Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

### **3.7 Bus and Coach Stations**

The criteria for assessing roads with significantly changed traffic flows are set out in Box 5.3, section A7 of TG(09) and are unchanged from previous rounds of Review and Assessment. Bus and coach stations were considered in previous Updating and Screening Assessments and no such locations identified.

Reigate and Banstead Borough Council confirms that there are no relevant bus stations in the Local Authority area.



## 4 Other Transport Sources

### 4.1 Airports

The criteria for assessing airports are set out in Box 5.4, section B1 of TG(09) and are less stringent than previous rounds of Review and Assessment. Airports were considered in previous Review and Assessments and Gatwick identified as significant.

Gatwick Airport is near the boundary of Reigate and Banstead Borough Council. However, this source has been previously assessed, and an AQMA declared in the vicinity of the airport.

### 4.2 Railways (Diesel and Steam Trains)

#### 4.2.1 Stationary Trains

The criteria for assessing stationary locomotives are set out in Box 5.4, section B2 of TG(09) (Approach 1) and are unchanged from previous rounds of Review and Assessment. Locations where diesel or steam locomotives may regularly remain stationary for 15 minutes or more were considered in previous Updating and Screening Assessments and no such locations identified. Redhill station has been identified as a location where diesel locomotives are stationary for 15 minutes or more. However, trains are shunted off the end of the platform, away from people waiting, and it is therefore considered that exposure to the 15 minute sulphur dioxide objective is unlikely.

Reigate and Banstead Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

#### 4.2.2 Moving Trains

The criteria for assessing moving locomotives are set out in Box 5.4, section B2 of TG(09) (Approach 2). These are new for the 2009 Updating and Screening Assessment. None of the rail lines listed in Table 5.1 of the Technical Guidance LAQM.TG(09) pass through Reigate and Banstead Borough Council. Therefore there are no locations with a 'large number' of movements of diesel locomotives.

Reigate and Banstead Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

## 4.3 Ports (Shipping)

The criteria for assessing ports are set out in Box 5.4, section B3 of TG(09) and are unchanged from previous rounds of Review and Assessment.

Reigate and Banstead Borough Council is landlocked and there has no ports or shipping that meet the specified criteria within the Local Authority area.

## 5 Industrial Sources

### 5.1 Industrial Installations

#### 5.1.1 New or Proposed Installations

The criteria for assessing industrial installations are set out in Box 5.5, section C1 of TG(09) and are unchanged from previous rounds of Review and Assessment. There are no new industrial installations for which planning approval has been granted.

Reigate and Banstead Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

#### 5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

None of the industrial installations identified in previous Updating and Screening Assessments have substantially increased emissions and no new exposure has been introduced nearby.

Reigate and Banstead Borough Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

### 5.2 Major Fuel (Petrol) Storage Depots

The criteria for assessing major fuel (petrol) storage depots are set out in Box 5.5, section C2 of TG(09) and are unchanged from previous rounds of Review and Assessment. Major petrol storage depots were considered in the previous Updating and Screening Assessments and no such locations identified.

There are no major fuel (petrol) storage depots within the Local Authority area.

### 5.3 Petrol Stations

The criteria for assessing petrol stations are set out in Box 5.5, section C3 of TG(09) and are unchanged from previous rounds of Review and Assessment. All petrol filling stations were considered in the previous Updating and Screening Assessments and were found not to meet all the relevant criteria. There are no large petrol stations in Reigate and Banstead Borough Council with exposure within 10m of the pumps.

Reigate and Banstead Borough Council confirms that there are no petrol stations meeting the specified criteria.

## 5.4 Poultry Farms

The criteria for assessing poultry farms are set out in Box 5.5, section C4 of TG(09). They form a new section for the 2009 Updating and Screening Assessment. There are no farms exceeding the relevant criteria (turkey units with greater than 100,000 birds, naturally ventilated units with greater than 200,000 birds or mechanically ventilated units with greater than 400,000) within Reigate and Banstead.

Reigate and Banstead Borough Council confirms that there are no poultry farms meeting the specified criteria.

## 6 Commercial and Domestic Sources

### 6.1 Biomass Combustion – Individual Installations

The criteria for assessing biomass combustion (individual installations) are set out in Box 5.8, section D1 of TG(09). They form a new section of the 2009 Updating and Screening Assessment. A 0.84 MW boiler in Redhill has been identified within a housing development. The ADMS4 model was run using relevant stack parameters, building heights and emissions data. The model indicates the maximum 90<sup>th</sup> percentile 24-hour PM<sub>10</sub> concentration of 4.5 µg/m<sup>3</sup> and maximum annual mean of 2.1 µg/m<sup>3</sup>. The background at this location is 19 µg/m<sup>3</sup>. It is therefore concluded that a more Detailed Assessment is not required for this boiler.

Reigate and Banstead Borough Council has assessed the biomass combustion plant identified in Redhill, and concluded that it will not be necessary to proceed to a Detailed Assessment.

### 6.2 Biomass Combustion – Combined Impacts

The criteria for assessing biomass combustion (combined impacts) are set out in Box 5.8, section D2 of TG(09). They form a new section of the 2009 Updating and Screening Assessment. The likelihood of areas of combined biomass combustion exceeding the criteria is considered highly unlikely.

Reigate and Banstead Borough Council confirms that there are no areas where combined biomass combustion plants are likely to be significant.

### 6.3 Domestic Solid-Fuel Burning

The criteria for assessing domestic solid-fuel burning are set out in Box 5.8, section D2 of TG(09) and are unchanged from previous Review and Assessments. Domestic solid fuel burning has been considered in previous Updating and Screening Assessments and not considered significant. There has been no change to this situation.

Reigate and Banstead Borough Council confirms that there are no areas of significant domestic solid fuel use in the Local Authority area.

## 7 Fugitive or Uncontrolled Sources

The criteria for assessing fugitive or uncontrolled sources are set out in Box 5.10, section E1 of TG(09) and are unchanged from previous Review and Assessments. Fugitive or uncontrolled sources of PM<sub>10</sub> such as quarries, landfill sites and opencast coal sites were considered in previous Updating and Screening Assessments. No significant sources were identified. Reigate and Banstead Borough Council have not identified any further fugitive or uncontrolled sources. There have been problems relating to dust on unsurfaced access roads at a waste transfer station but the problem has now been resolved.

Reigate and Banstead confirms that there are no potential significant sources of fugitive particulate matter emissions in the Local Authority area.

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

The monitoring carried out in the Borough has not identified any exceedences of the PM<sub>10</sub> or benzene objectives.

The nitrogen dioxide results show that the annual mean objective has been met at the majority of locations within Reigate and Banstead. A substantial number of locations within the Air Quality Management Areas (AQMAs) are, however, still showing exceedences. In addition, a number of new sites not currently in AQMAs have concentrations above the objective. In Redhill, there are 4 monitoring locations showing exceedences and it is proposed that a Detailed Assessment is carried out covering Redhill, examining relevant exposure in detail. In addition, the diffusion tube on Reigate Hill is also showing exceedences. This has been extrapolated back to the façade of the nearest property and exceedences are still likely at the façade of the nearest property. A Detailed Assessment is also required for this location.

### **8.2 Conclusions from Assessment of Sources**

The USA has not identified any significant changes in emissions sources within the Reigate and Banstead Borough area. There have been no new relevant industrial installations and no new or substantially altered roads within the Reigate and Banstead Borough area. One road junction (A23 and Maple Road) has been identified as potentially significant and assessed using DMRB, but it is concluded that a Detailed Assessment is not required for this location. A 0.84 MW biomass boiler has also been assessed using ADMS4 and it is concluded that a Detailed Assessment is not required at this location. There are no other new significant commercial, domestic or fugitive sources of emissions.

### **8.3 Proposed Actions**

A Detailed Assessment and Progress Report will be completed by April 2010.

## 9 Consultation

*Note: the following section has been added by Reigate and Banstead BC to the original updating and screening assessment report. Aside from this additional section the report remains unchanged from the report sent out for consultation in June 2009, bar a change in the title of table 2.7a from 'Results of Ozone Automatic Monitoring: Comparison to Annual mean objective' to 'Results of Ozone Automatic Monitoring: Annual mean concentrations'.*

A consultation on the 2009 updating and screening assessment was undertaken between 6<sup>th</sup> June 2009 and the 13<sup>th</sup> July 2009, with letters sent to the statutory consultees and other interested parties listed in Table 9.1. A letter was also sent to all residents within the areas that will be subject to a detailed assessment in 2010, setting out the findings of the USA, and inviting comments and questions.

None of the residents contacted responded to the consultation, and the statutory consultees who responded are marked in Table 9.1. The overall response from the statutory consultees was that the findings of the report were accepted, with the Highways Agency pointing out that their focus was only on roads for which they were responsible.

Organisation	Response received
Crawley Borough Council	Y
DEFRA	Y
East Elmbridge and Mid Surrey PCT	N
East Surrey Highways – Surrey County Council	N
Environment Agency Thames Region (SE Area)	Y
Epsom & Ewell Borough Council	N
Highways Agency	Y
London Borough of Croydon	Y
London Borough of Sutton	N
Mayor of London	Y
Mole Valley District Council	N
Planning & Environment Gatwick Airport	N
South East Coast Strategic Health Authority	N
Surrey County Council - Transportation	N
Sussex Air Quality Steering Group	Y
Tandridge District Council	N

**Table 9.1 Statutory Consultees and other interested groups.**

Where consultees have had specific questions these have been responded to directly, and these responses are summarised below.

The Highways Agency sought clarification over the absence of monitoring data from monitoring site RB97 and the location of RB102, as both of these sites are connected to the M23 south air quality management area (AQMA). It was explained that the RB97 monitoring site was located on a property within the M23 south AQMA, but that there were on going access problems and so the site was discontinued in June 2005, with a new site set up (RB102) to the north of AQMA in June 2005. While the RB102 site is located in a field, and not within the AQMA, it is at the same distance from the M23 as the residential property and the M23 is elevated to the same degree, and so the site is in effect a surrogate for the RB97 site.

DEFRA accepted the findings of the report but made the following observations:

*i) it would be helpful to clearly state the type of PM monitor used, and also to provide information relating to the VCM correction (e.g. which sites were used in the correction and the average adjustment factor).*



PM<sub>10</sub> monitoring in the Borough is undertaken using an R&P TEOM 1400a. The data was corrected using the VCM method using FDMS data from the Bexley 7, Chichester Roadside, and Tower Hamlets 4 sites. Data capture at each of the sites was 92 %, 97 %, and 95 % respectively, and details on the sites can be found at [www.londonair.org.uk](http://www.londonair.org.uk).

The uncorrected TEOM value at RG1 is 15.8 µg m<sup>-3</sup> and with the VCM correction applied this rises to 19.7 µg m<sup>-3</sup>, a 25 % correction (this compares to the blanket 30 % correction applied under the old methodology). Applying the volatile correction methodology also results in the number of days over 50 µg m<sup>-3</sup> rising from 4 to 5 days.

*ii) In the DMRB modelling of the Maple Road Junction, Three Arch Road does not appear to have been accounted for in the modelling. It may be worth considering locating a diffusion tube near the junction for a short period to confirm the DMRB results.*

The DMRB calculation has now been performed with the Three Arch Road site included (5000 AADT, 2 % HGV) and the results are summarised below:

	Old Total NO <sub>2</sub>	'New' Total NO <sub>2</sub>	Old PM <sub>10</sub>	'New' PM <sub>10</sub>
Receptor A	28.4	29.5	22.8	23.1
Receptor B	26.7	27.8	22.2	22.5
Receptor C	24.1	25.4	21.2	21.6

**Table 9.2: DMRB Modelled Annual Mean Nitrogen Dioxide and PM<sub>10</sub> Concentrations (µg m<sup>-3</sup>) in 2008, at Receptors around the A23 / Maple Road Junction with (new) and without (old) Three Arch Road.**

As the modelled annual mean nitrogen dioxide concentrations are more than 25 % below the annual mean objective, there are no immediate plans to install diffusion tube monitoring at this site even allowing for the council's concerns about the performance of the DMRB model (see below). However, it is likely that preliminary monitoring will be installed at this site in the medium term, given the traffic increases that are likely from developments proposed for Redhill in the longer term.

*iii) It is unclear why the junction at Hooley was not studied using DMRB. It would be prudent for the council to examine the first 6 months of data for 2009 at this location and assess them in terms of the likelihood of exceedence. If they demonstrate concentrations above 40 µg/m<sup>3</sup>, then the council should move to incorporate the location within the detailed assessment to be submitted in April 2010.*

This particular area has been assessed in the past by full dispersion modelling, as part of the stage 3 assessment, and more recently by DMRB, and on both occasions the annual mean nitrogen dioxide objective was predicted to be met. The DMRB calculation for this site (Abbot NO<sub>x</sub> to NO<sub>2</sub> 'correction' applied) suggests that the annual mean concentration of nitrogen dioxide is likely to be around 34.9 µg m<sup>-3</sup> i.e. around 12 % below the annual mean objective. Based on this result and the guidance in TG(09) a detailed assessment is not required.

However, we have concerns about how realistic the DMRB result is for this site, despite it being a 'straight forward' road setting, and so two diffusion tubes were installed as part of a 'look / see' exercise. To date there have been some tube thefts, and thus we currently have a limited data set, and therefore we will make a decision to proceed to a detailed assessment in the 2010 progress report. There are two main reasons for taking this approach:

- a) extrapolating 6 months data to 12 months has led to considerable over and under estimates of nitrogen dioxide concentrations in the past. As the purpose of the monitoring exercise is to address our concerns over the DMRB, taking such a 'shortcut' does little to address such concerns.
- b) any dispersion model undertaken as part of a detailed assessment needs to be 'validated' using monitoring data. Using very limited data to 'validate' a dispersion

model rather than reducing the uncertainty associated with the model, if anything is likely to add to the uncertainty.

In essence, by taking the approach that we are proposing this will confirm or disprove our concerns relating to the DMRB with a greater degree of certainty. If our concerns are justified additional monitoring can then be installed for a year prior to the production of the detailed assessment, so that the dispersion model used in the assessment can be verified with a greater degree of confidence both at any given point and spatially.

*iv) With the assessment of the biomass installation, it would be helpful to compare with the 90<sup>th</sup> percentile from the local PM<sub>10</sub> monitoring as well as the annual mean concentration. Also no indication of the location of the site is given – consideration should be made as to whether the impacts of emissions from the boiler may intersect with other already elevated areas of PM<sub>10</sub> concentration such as near busy roads.*

The 90 %ile from the local PM<sub>10</sub> monitoring is 30.4 µg m<sup>-3</sup> and given the maximum 90 %ile from the boiler itself is modelled at 4.5 µg m<sup>-3</sup>, it is unlikely that more than 35 days per year will be over 50 µg m<sup>-3</sup>. As described in the report the boiler is located on a residential housing estate in Redhill. There is housing to the south and west, to the east there are open fields and then housing around 1 km from the site, while to the north is a light commercial industrial estate – with no significant PM<sub>10</sub> sources. The nearest ‘major’ road is an A road 500 m to the east of the site, hence the conclusion that a detailed assessment was not required.

## 9 References

1. Department for Environment, Food and Rural Affairs (2009), *Part IV of the Environment Act 1995: Local Air Quality Management, Technical Guidance LAQM.TG(09)*. DEFRA, London.
2. Reigate and Banstead Borough Council (May 2007) Detailed Assessment of Air Quality in Merstham.
3. Reigate and Banstead Borough Council (May 2008) Further Assessment of Air Quality in Merstham.
4. Reigate and Banstead Borough Council (May 2006) Updating and Screening Assessment within the Borough of Reigate and Banstead

# Appendices

Appendix A: Diffusion Tube Locations

Appendix B: QA/QC Data

Appendix C: DMRB Calculations

## Appendix A: Diffusion Tube Locations

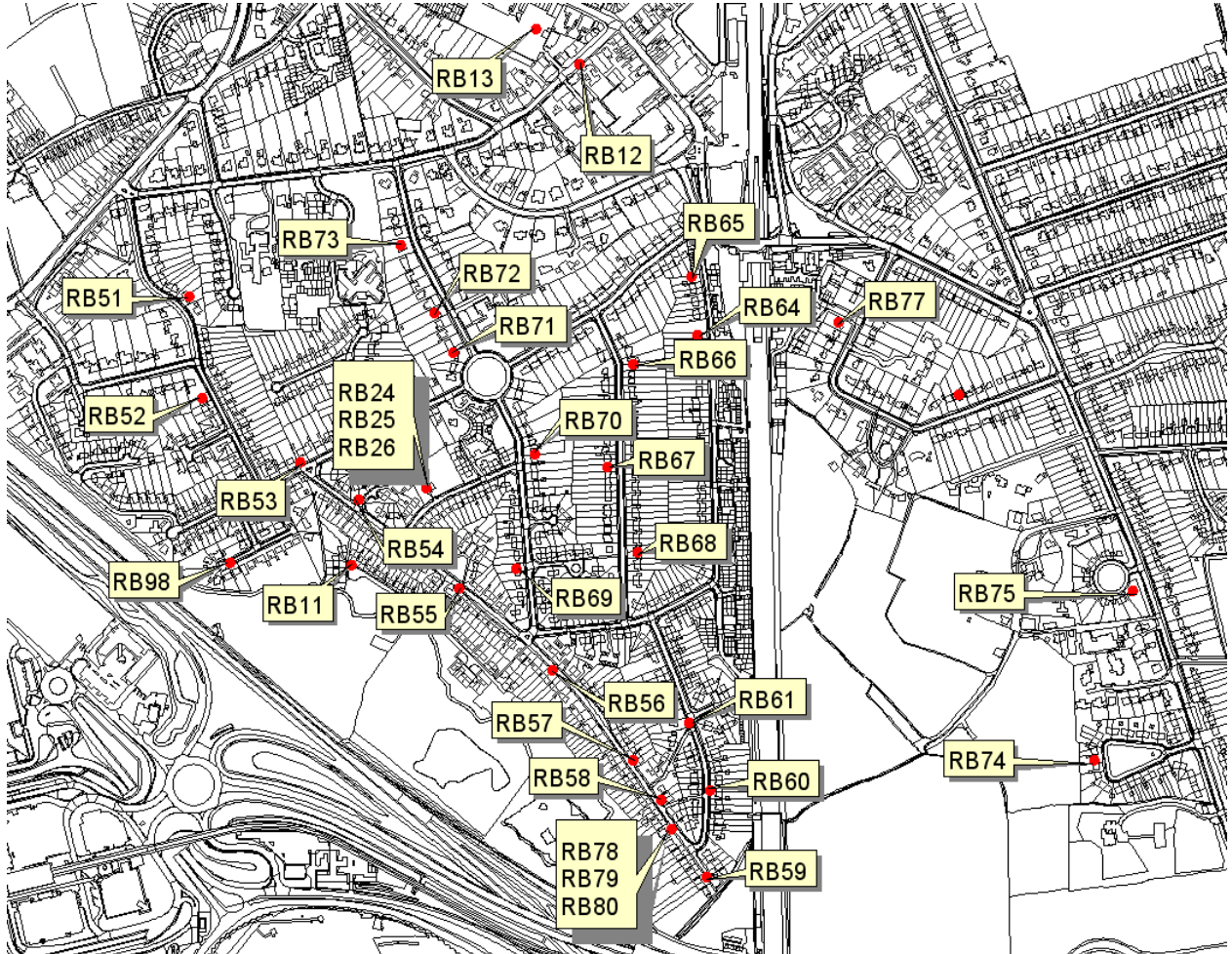


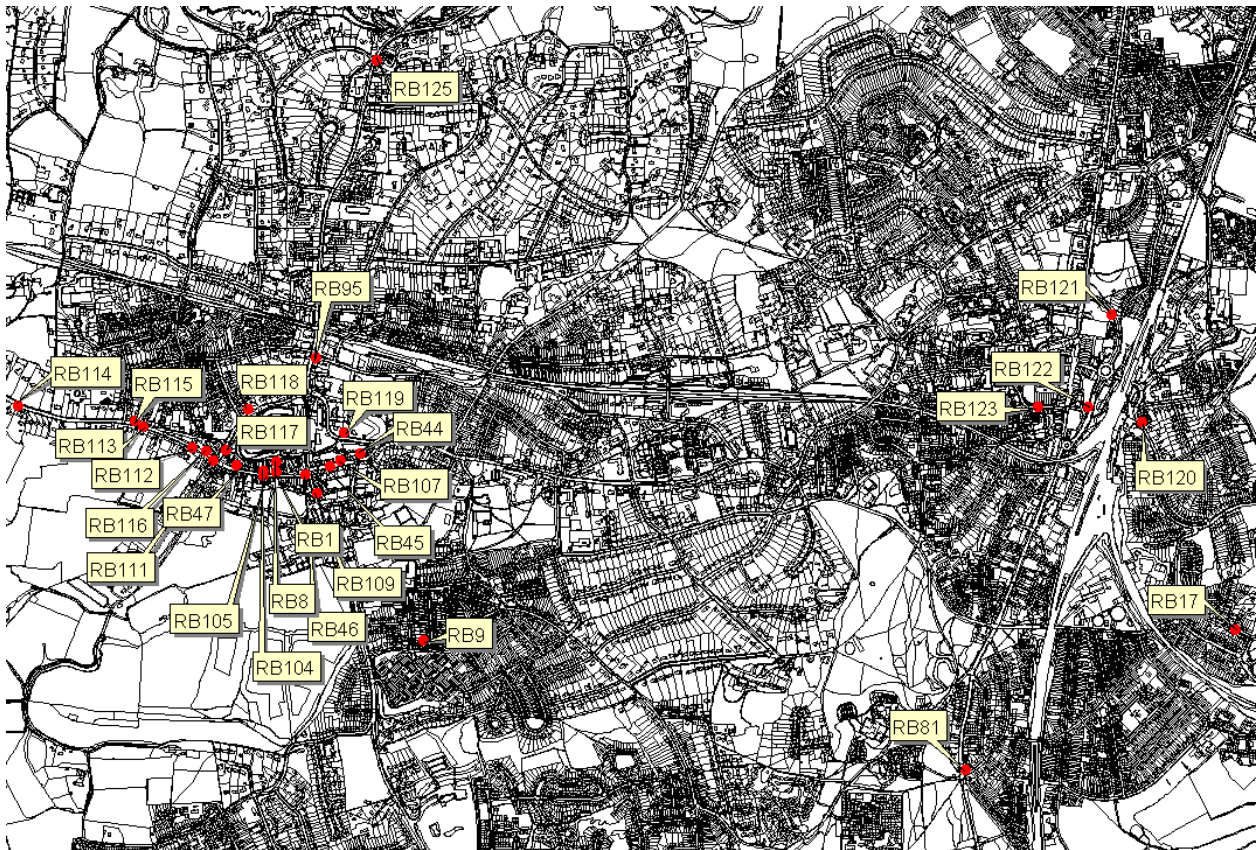
Figure A1. Horley Diffusion Tubes © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



**Figure A2. M23 South and wider Gatwick Diffusion Tubes** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



**Figure A3. Drift Bridge AQMA and Banstead Diffusion Tubes** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405



**Figure A4. Reigate and Redhill Diffusion Tubes** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405





**Figure A5. M25 and Merstham Diffusion Tubes** © Crown Copyright. Reigate & Banstead Borough Council. Licence no 100019405.

## Appendix B: QA:QC Data

### Diffusion Tube Bias Adjustment Factors

Reigate and Banstead Borough Council use diffusion tubes prepared and analysed by Lambeth Scientific Services (50% TEA in acetone). The national bias adjustment factor for Lambeth is 0.97 (spreadsheet 05/09) compared to the local factor for Reigate and Banstead of 1.02.

### Factor from Local Co-location Studies

Site Type	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ( $\mu\text{g}/\text{m}^3$ )	Automatic Monitor Mean Conc. (Cm) ( $\mu\text{g}/\text{m}^3$ )	Bias Adjustment Factor (A) (Cm/Dm)
O	12	25	27	1.10
O	11	33	33	1.00
O	12	20	19	0.97
<b>Average Factor</b>				<b>1.02</b>

### Discussion of Choice of Factor to Use

The national bias adjustment factor for Lambeth is 0.97 compared to the local factor for Reigate and Banstead of 1.02. The local factor has been used as it is more precautionary.

### Short-term to Long-term Data Adjustment

Nitrogen dioxide concentrations at the diffusion tubes at Redhill (RB 120 to RB123), Reigate Hill (RB 125) and Banstead High Street (RB 126) are available from June 2007 until December 2008. Adjusted 2007 results from this monitoring site, for the available period mean, exceed the annual mean objective at RB 120, 121, 123, 124, 125 and 126.

To further assess the likelihood of nitrogen dioxide concentrations exceeding the annual mean objective in 2007, the period mean was annually adjusted following guidance in Box 3.2 LAQM TG(09) (Defra, 2009). Results from the three nearest relevant AURN monitoring sites were used to calculate a ratio between the period mean and the annual mean. This was then applied to the measured, adjusted period mean at the diffusion tube site to calculate the projected annual mean. The ratios are calculated in the table below.

Table B.2. Adjustment of short term data

Site	Site Type	Annual Mean	Period Mean	Ratio
Brighton Preston Park	Urban Background	21.8	20.8	1.046
Thurrock	Urban Background	34.0	33.9	1.003
London Teddington	Urban Background	28.4	28.1	1.010
			Average	1.020

### PM Monitoring Adjustment

The Michael Crescent PM<sub>10</sub> data have been adjusted using the Volatile Correction Model ([www.volatile-correction-model.info](http://www.volatile-correction-model.info)).

### **QA/QC of automatic monitoring**

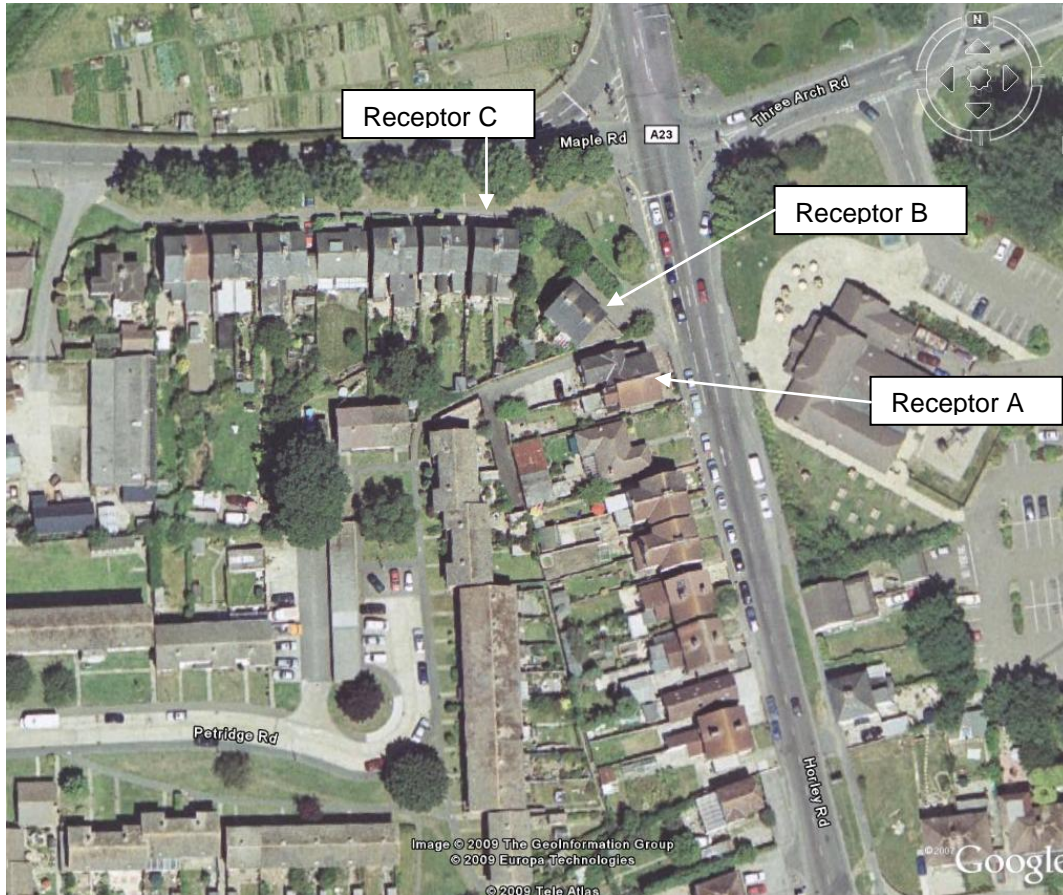
The automatic monitors are calibrated automatically over night and manually calibrated every 14 days. Data is ratified and verified by ERG. QA/QC is carried out by NPL.

### **QA/QC of diffusion tube monitoring**

Results from the WASP scheme show acceptable performance for Lambeth Scientific Services, however, the laboratory precision is relatively poor. Lambeth Scientific Services have also confirmed that they follow the procedures set out in the Harmonisation Practical Guidance.

## Appendix C: DMRB Calculations

The junction of the A23 and Maple Road is shown below. 3 potential receptors, closest to the junction were chosen for assessment.



Traffic data for the A23 were taken from the DfT website (<http://www.dft.gov.uk/matrix/>) and for Maple Road a worst-case assumption of 5000 AADT was used. An assumption of an average speed of 15 kph at the junction was used. All other input data are included below. Verification was not undertaken but the DMRB was used to predict NO<sub>x</sub> concentrations at the 3 receptors, then converted using the NO<sub>x</sub>/NO<sub>2</sub> calculator available at [www.airquality.co.uk/laqm/tools/no2tonox8\\_ja\\_b.xls](http://www.airquality.co.uk/laqm/tools/no2tonox8_ja_b.xls).

### Input Data

Location/ Receptor	Grid Square	Background Concentrations ( $\mu\text{g}/\text{m}^3$ )			
		Year	NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>
A, B and C	527500,148500	2008	20.98	16.40	18.58

Location/ Receptor	Link number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
			AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV (<3.5t GVW)	Total % HDV (>3.5t GVW)
A	1	9.2	27180	15	A	96.85	3.15
	2	48	5000	15	B	100	0
B	1	17	27180	15	A	96.85	3.15
	2	31	5000	15	B	100	0
C	1	30	27180	15	A	96.85	3.15
	2	30	5000	15	B	100	0

Location/ Receptor	Name	Year	Total NO <sub>x</sub> <sup>1</sup>	Rd NO <sub>x</sub> <sup>2</sup>	Adj Total NO <sub>2</sub> <sup>3</sup>	PM <sub>10</sub>	
			Annual mean µg/m <sup>3</sup>	Annual mean µg/m <sup>3</sup>	Annual mean µg/m <sup>3</sup>	Annual mean µg/m <sup>3</sup>	Days >50µg/m <sup>3</sup>
1	Receptor A	2008	50.18	29.20	28.44	22.82	8
2	Receptor B	2008	45.40	24.42	26.67	22.16	7
3	Receptor C	2008	38.84	17.86	24.11	21.23	5

<sup>1</sup> Total NO<sub>x</sub> = direct from DMRB local output sheet

<sup>2</sup> Rd NO<sub>x</sub> = Total NO<sub>x</sub> – Background NO<sub>x</sub>

<sup>3</sup> Total NO<sub>2</sub> calculated using NO<sub>x</sub>/ NO<sub>2</sub> calculator