# 2009 Air Quality Updating and Screening Assessment for Mid Sussex District Council

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

Date (April, 2009)

| | |
|---|---|
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# Executive Summary

The atmospheric emission sources in the Mid Sussex District Council district have been examined and those aspects that have changed since our Progress Report 2008 have been identified.

Recent monitoring data has been used to assess compliance with the national air quality objectives. The following conclusions have been reached for each of the pollutants:

**Nitrogen dioxide:**

Exceedences of the annual mean air quality objective have been identified at:

2 sites in the Stonepound crossroads area of Hassocks (Site ID's MSAQ10 MSAQ11).

Potential exceedences of the annual mean air quality objective have been identified at:

3 sites in the Stonepound crossroads area of Hassocks (Site ID's MSAQ12 MSAQ13 & MSAQ14)
1 of these sites has relevant exposure (Site ID MSAQ13).

A Detailed Assessment is therefore required for the Stonepound crossroads area of Hassocks.

**Particulate matter ($PM_{10}$)**
No further action required.

**Sulphur dioxide**
No further action required.

**Benzene:**
No further action required.

**Carbon monoxide:**
No further action required.

**1,3-Butadiene:**
No further action required.

**Lead:**
No further action required.

Work has now commenced on the Detailed Assessment in the Stonepound area and a separate report will be produced later this year.

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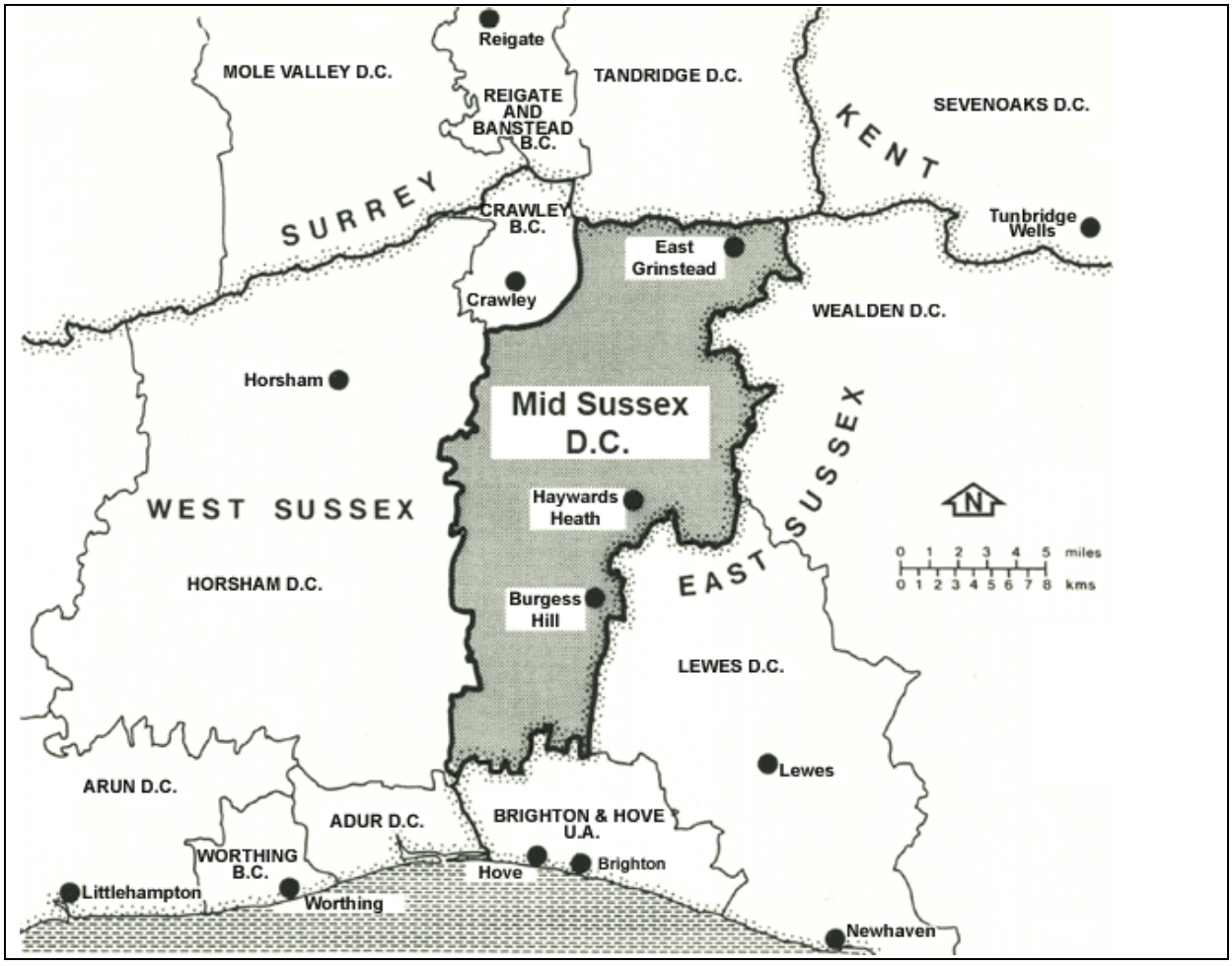
# 1 Introduction

## 1.1 Description of Local Authority Area

Mid Sussex District Council is located within the County of West Sussex. More than half the area is designated as an Area of Outstanding Natural Beauty. It lies on the eastern edge of the county and shares boundaries with East Sussex to the east, Surrey to the north and Brighton and Hove to the south.
Mid Sussex covers an area of some 33,400 hectares (approximately 128 square miles) and includes the three main towns of East Grinstead, Burgess Hill and Haywards Heath in a predominantly rural area in which there are some 25 villages and many small hamlets.
The District has a population of approximately 128,000. Sixty percent of the population live in the three main towns with the remaining forty percent living in the smaller villages and rural areas. It is well served by transport links to London, Gatwick Airport, the M25, the coast and Europe.



## 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 undertake a Detaled Assessment, and if exceedences are confirmed, 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 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 micrommes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, $mg/m^3$ 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 | |
| **Benzene** | | | |
| | 16.25 $\mu$g/m$^3$ | Running annual mean | 31.12.2003 |
| | 5.00 $\mu$g/m$^3$ | Running annual mean | 31.12.2010 |
| **1,3-Butadiene** | 2.25 $\mu$g/m$^3$ | Running annual mean | 31.12.2003 |
| **Carbon monoxide** | 10.0 mg/m$^3$ | Running 8-hour mean | 31.12.2003 |
| **Lead** | 0.5 $\mu$g/m$^3$ | Annual mean | 31.12.2004 |
| | 0.25 $\mu$g/m$^3$ | Annual mean | 31.12.2008 |
| **Nitrogen dioxide** | 200 $\mu$g/m$^3$ not to be exceeded more than 18 times a year | 1-hour mean | 31.12.2005 |
| | 40 $\mu$g/m$^3$ | Annual mean | 31.12.2005 |
| **Particles ($PM_{10}$) (gravimetric)** | 50 $\mu$g/m$^3$, not to be exceeded more than 35 times a year | 24-hour mean | 31.12.2004 |
| | 40 $\mu$g/m$^3$ | Annual mean | 31.12.2004 |
| **Sulphur dioxide** | 350 $\mu$g/m$^3$, not to be exceeded more than 24 times a year | 1-hour mean | 31.12.2004 |
| | 125 $\mu$g/m$^3$, not to be exceeded more than 3 times a year | 24-hour mean | 31.12.2004 |
| | 266 $\mu$g/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

Under the Environment Act 1995, local authorities are required to Review and Assess air quality on a regular basis. A *review* of air quality means a consideration of the levels of pollutants in the air for which objectives are prescribed in Regulations[1], and estimations of future levels. An *assessment* of air quality is the consideration of whether estimated levels for the relevant future period are likely to exceed the levels set in the objectives.

The first review and assessment round for Mid Sussex District Council was completed in June 2000 and concluded that the national air quality objectives were not likely to be exceeded at any locations in the District. The second round of review and assessment was completed in April 2006 and concluded again that the national air quality objectives were not likely to be exceeded at any locations in the District. The recent Air Quality Progress Report 2008 identified that the measured and predicted results for both the annual mean and the number of exceedences of the hourly levels over 12 months will be met within the relevant timescale for 10 sites being monitored. However, it concluded that pollution levels at the Stonepound crossroads, Hassocks site were likely to exceed the annual mean air quality objective for nitrogen dioxide and additional monitoring of the area would be undertaken to determine if the authority needs to declare an Air Quality Management Area (AQMA).

A summary of previous reports carried out in the District are contained in Table 1.2

**Table 1.2 Summary of Previous Review and Assessments**

| Previous Review /Assessment | Date | Exceedences | AQMA's Declared | Outcome |
|---|---|---|---|---|
| Stage 1 Review & Assessment Report | Dec 1998 | None | None | |
| Stage 2 Review & Assessment Report | June 2000 | None | None | |
| Updating & Screening Assessment 2003 * | April 2003 | None | None | |
| Air Quality Progress Report 2004 * | April 2004 | None | None | |
| Air Quality Progress Report 2005 * | April 2005 | None | None | |
| Updating & Screening Assessment 2006 * | April 2006 | None | None | |
| Air Quality Progress Report 2007 * | April 2007 | None | None | |
| Air Quality Progress Report 2008 * | April 2008 | $NO_2$ at 2 sites | None | Detailed Assessment Required for $NO_2$ |

* Copies of these reports are available on the Council's website at:-
http://www.midsussex.gov.uk/page.cfm?pageID=2231

[1] DETR (2000) The Air Quality (England) Regulations.
DEFRA (2002) The Air Quality (England) (Amendment) Regulations.

# 2 New Monitoring Data

## 2.1 Summary of Monitoring Undertaken

### 2.1.1 Automatic Monitoring Sites

**Monitoring of air quality across Sussex.**

Mid Sussex District Council are members of the Sussex Air Quality Partnership (Sussex Air) which benefits from the co-ordinated monitoring of air pollutants across the region. The Sussex Air Quality Monitoring Network is managed and co-ordinated by King's College London ERG, on behalf of Sussex-air and they provide data calibration and ratification of results. Refer to www.sussex-air.net
Mid Sussex have no automatic monitoring sites at present.
Table 2.1 provides details of Sussex air quality monitoring stations and pollutants monitored.

**Table 2.1 Sussex air quality monitoring stations and pollutants monitored (2008).**

| | Authority | Location | Pollutant |
|---|---|---|---|
| 1 | Adur | Shoreham High St | NOx |
| 2 | Brighton & Hove/AURN | Brighton Pavilion | $NO_X$ $O^3$ |
| 3 | Brighton & Hove/AURN | Hove Roadside | $NO_X$ $O^3$ |
| 4 | Brighton & Hove C.C. | Foredown Tower | $O^3$ |
| 5 | Chichester D.C. | A27 Ring Road | $PM_{10}$(grav), NOx, $O^3$ |
| 6 | Chichester D.C. | Lodsworth | $O^3$ |
| 7 | Crawley B.C. | East Gatwick | NOx |
| 8 | Eastbourne B.C. | Devonshire Park | $PM_{10}$(grav), NOx, $O^3$ |
| 9 | Hastings B.C. | Hastings/Bexhill (A259) | $PM_{10}$, NOx, $O^3$ |
| 10 | Hastings B.C. | Freshfields (A259) | $PM_{10}$, NOx |
| 11 | Horsham D.C. | Horsham centre | $PM_{10}$, NOx |
| 12 | Lewes D.C. | Telscombe Cliffs | $PM_{10}$, NOx, $O^3$ |
| 13 | Lewes D.C. | Lewes Town Centre | $PM_{10}$, NOx |
| 14 | Rother D.C. | Rye Harbour | $O^3$ |
| 15 | Rother D.C. | Bexhill (A259) | NOx, $PM_{10}$ |
| 16 | Worthing B.C. | High St, Worthing | NOx |
| 17 | Wealden D.C. | Isfield | $O^3$ |
| 18 | Sussex County Lab. | Mobile unit | $PM_{10}$, NOx,$O^3$, CO |
| 19 | DEFRA - AURN | Preston Park, Brighton | NOx, $O^3$ |
| 20 | DEFRA - AURN | Lullington Heath, Wealden | NOx, $O^3$, $SO_2$ |

**Key:**

| | | |
|---|---|---|
| CO | - | carbon monoxide |
| NOx | - | oxides of nitrogen (includes $NO_2$ nitrogen dioxide) |
| $O^3$ | - | ozone |
| $PM_{10}$(grav) | - | particles less than 10 microns (measured gravimetrically) |
| $PM_{10}$ | - | particles less than 10 microns (measured non gravimetrically) |
| $SO^2$ | - | sulphur dioxide |

## 2.1.2 Non-Automatic Monitoring

Across the District there are 19 locations where nitrogen dioxide diffusion tubes are located (Table 2.2).
The Air Quality Progress Report 2008 indicated the Stonepound crossroads, Hassocks location as an area at risk of exceeding the air quality objective for nitrogen dioxide.
8 additional monitoring sites were added to the network in July 2008.

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

| **Site Name** | **Site Type** | **OS Grid Ref** | **Pollutants Monitored** | **In AQMA?** | **Relevant Exposure?** *(Y/N with distance (m) to relevant exposure)* | **Distance to kerb of nearest road** *(N/A if not applicable)* |
|---|---|---|---|---|---|---|
| South Road Haywards Heath | Roadside | X 533342 Y 123588 | $NO_2$ | N | Y (3m) | 2.5m |
| Partly constructed Haywards Heath Relief Road | Roadside | X 532184 Y 122459 | $NO_2$ | N | N | N/A |
| London Road East Grinstead | Kerbside | X 538690 Y 138757 | $NO_2$ | N | N | 0.5m |
| Court Close East Grinstead | Suburban | X 539919 Y 138162 | $NO_2$ | N | Y (14m) | 0.5m |
| Lewes Road East Grinstead | Suburban | X 541243 Y 136998 | $NO_2$ | N | N | 1.5m |
| Smugglers End Handcross | Roadside | X 526134 Y 129828 | $NO_2$ | N | Y (0m) | N/A |
| Crabbet Park Worth | Suburban | X 530440 Y 137280 | $NO_2$ | N | Y (0m) | N/A |
| Pyecombe Street Pyecombe | Roadside | X 528477 Y 112870 | $NO_2$ | N | Y (12m) | 1m |
| Water Tower Colwood Lane Warninglid | Rural | X 525658 Y 125037 | $NO_2$ | N | N | N/A |
| Stonepound 1 Keymer Road Hassocks | Roadside | X 529911 Y 115489 | $NO_2$ | N | Y (6.7m) | 1.5m |
| Stonepound 2 Keymer Road Hassocks | Roadside | X 529924 Y 115482 | $NO_2$ | N | Y (0m) | 3.1m |
| Bus Stop Keymer Road Hassocks | Kerbside | X 530006 Y 115484 | $NO_2$ | N | N | 1.1m |
| Lamp Post Keymer Road Hassocks | Kerbside | X 530044 Y 115472 | $NO_2$ | N | Y (10.3m) | 0.85m |

| | | | | | | |
|---|---|---|---|---|---|---|
| Façade of residential premises Brighton Road Hassocks | Roadside | X 529916 Y 115442 | $NO_2$ | N | Y (0m) | 11.5m |
| Lamp Post Brighton Road Hassocks | Kerbside | X 529984 Y115344 | $NO_2$ | N | Y (10m) | 1.25m |
| Bus Stop Brighton Road Hassocks | Kerbside | X 529907 Y 115445 | $NO_2$ | N | Y (9.8m) | 1.98m |
| Lamp Post Hurst Road Hassocks | Roadside | X 529804 Y 115549 | $NO_2$ | N | Y (13m) | 1.3m |
| Bus Stop London Road Hassocks | Kerbside | X 529911 Y 115598 | $NO_2$ | N | N | 1.7m |
| Traffic Light Sign London Road Hassocks | Kerbside | X 529932 Y 115603 | $NO_2$ | N | Y (7m) | 1.6m |

# 2.2 Comparison of Monitoring Results with AQ Objectives

## 2.2.1 Nitrogen Dioxide

Nitrogen dioxide is a respiratory irritant associated with both acute (short-term) and chronic (long-term) effects on human health, particularly in people with asthma. Nitrogen dioxide ($NO_2$) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides ($NO_X$). All combustions processes produce $NO_X$ emissions, largely in the form of nitric oxide, which is converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere.

The principal source of nitrogen oxides emissions in the UK is road transport. Major roads carrying large volumes of high-speed traffic are a predominant source, as are conurbations and city centres with congested traffic. Other significant sources of nitrogen oxides emissions include the electricity supply industry and other industrial and commercial sectors. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels.

Mid Sussex District Council operate a number of diffusion tube sampling sites. The results of sampling are contained in Table 2.4a. All data have been ratified ( Appendix 1), extrapolated to cover a calendar year where necessary, as stipulated in the technical guidance TG(09).
The 2008 annual means were below the $NO_2$ objective at most monitoring sites.
However, the objective was exceeded at the following locations:

- London Road East Grinstead - no action required as no relevant exposure
- Lewes Road East Grinstead - no action required as no relevant exposure
- Stonepound 1, Keymer Road, Hassocks* - A Detailed Assessment is ongoing and a separate report will be produced later this year
- Stonepound 2, Keymer Road, Hassocks* - A Detailed Assessment is ongoing and a separate report will be produced later this year

- Bus Stop, Keymer Road, Hassocks - no action required as no relevant exposure
- Lamp post, Keymer Road, Hassocks* - A Detailed Assessment is ongoing and a separate report will be produced later this year
- Bus Stop, London Road Hassocks - no action required as no relevant exposure

* These are sites with relevant exposure i.e. residential premises within 15 m of a monitoring site, or places where the public may be regularly exposed.

Mid Sussex has measured concentrations of Nitrogen Dioxide above the annual mean at 3 relevant locations and **are undertaking a Detailed Assessment** for Stonepound crossroads, Hassocks and the surrounding area.

## Automatic Monitoring Data

Mid Sussex has no automatic monitoring sites.

## 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 (μg/m$^3$) Adjusted for bias (0.87) | Notes |
|---|---|---|---|---|---|
| MSAQ1 | South Road Haywards Heath | N | 100 | 28.1 | Relevant exposure |
| MSAQ2 | Partly constructed Haywards Heath Relief Road | N | 83 | 14.7 | Not relevant public exposure. |
| MSAQ3 | London Road East Grinstead | N | 100 | **44.5** | Not relevant public exposure. Estimated Concentration at nearest receptor 26.2 (μg/m$^3$) |
| MSAQ4 | Court Close East Grinstead | N | 100 | 23.1 | Relevant exposure |
| MSAQ5 | Lewes Road East Grinstead | N | 100 | **40.5** | Not relevant public exposure Concentration at nearest receptor 25.6 (μg/m$^3$) |
| MSAQ6 | Smugglers End Handcross | N | 100 | 32.3 | Relevant exposure |
| MSAQ7 | Crabbet Park Worth | N | 100 | 32.5 | Relevant exposure |
| MSAQ8 | Pyecombe Street Pyecombe | N | 83 | 33.5 | Relevant exposure |
| MSAQ9 | Water Tower Colwood Lane Warninglid | N | 100 | 11.3 | Not relevant public exposure. |
| MSAQ10 | Stonepound 1 Keymer Road Hassocks | N | 100 | **48.7** | Relevant exposure Trilocated tubes |
| MSAQ11 | Stonepound 2 Keymer Road Hassocks | N | 100 | **48.1** | Relevant exposure Trilocated tubes |
| MSAQ12 | Bus Stop Keymer Road Hassocks | N | 100 | **46.4** (1) | Not relevant public exposure. Concentration at nearest receptor 24.5 (μg/m$^3$) |
| MSAQ13 | Lamp Post Keymer Road Hassocks | N | 100 | **43.2** (1) | Relevant exposure |
| MSAQ14 | Bus Stop London Road Hassocks | N | 100 | **42.4** (1) | Not relevant public exposure. Concentration at nearest receptor 28.1 (μg/m$^3$) |
| MSAQ15 | Traffic Light Sign London Road Hassocks | N | 100 | 39.3 (1) | Relevant exposure |
| MSAQ16 | Façade of residential premises Brighton Road Hassocks | N | 100 | 26.5 (1) | Relevant exposure |

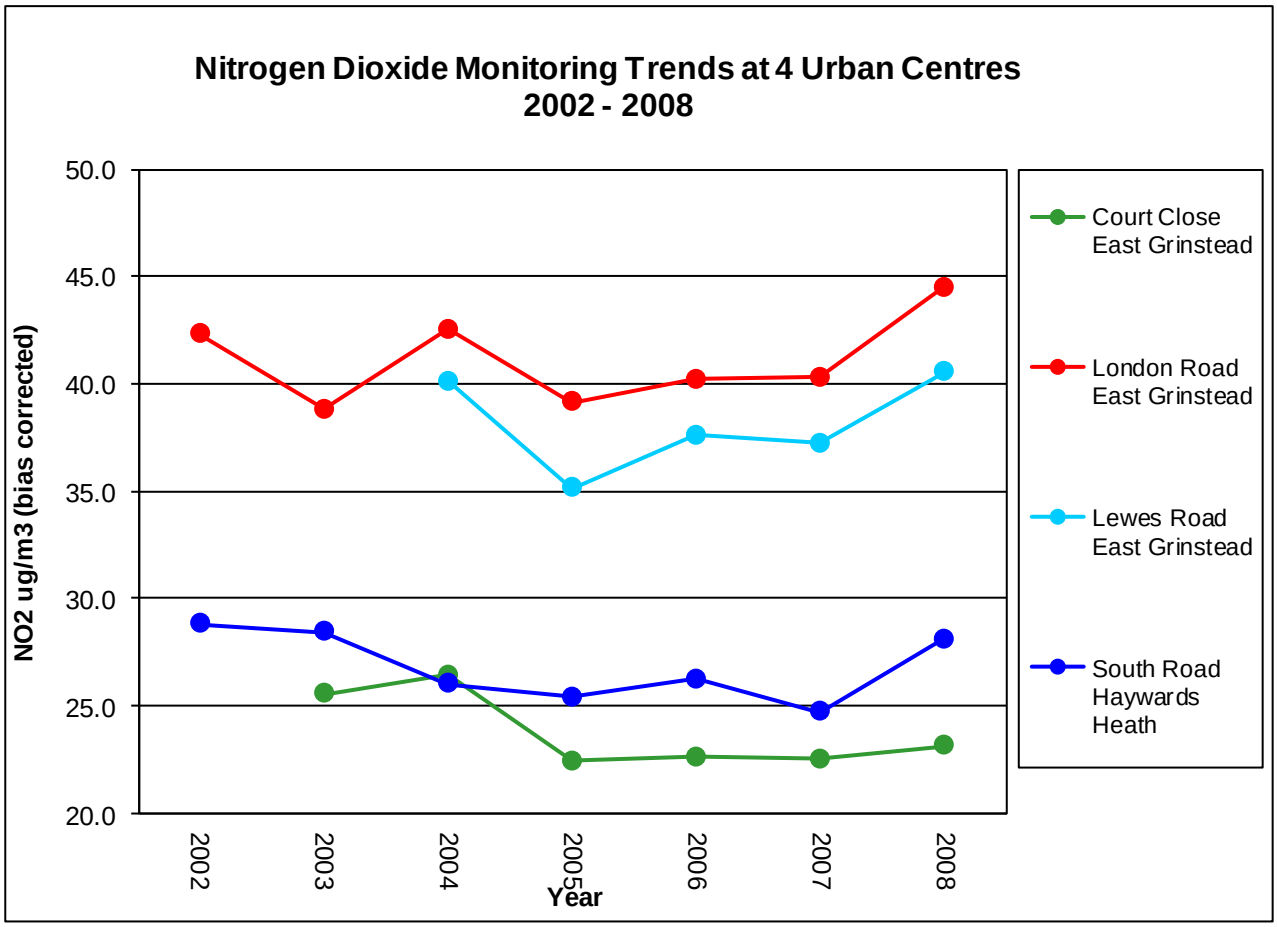
| | | | | | |
|---|---|---|---|---|---|
| MSAQ17 | Lamp Post<br>Brighton Road<br>Hassocks | N | 100 | 25.0 [(1)] | Relevant exposure |
| MSAQ18 | Bus Stop<br>Brighton Road<br>Hassocks | N | 100 | 32.1 [(1)] | Relevant exposure |
| MSAQ19 | Lamp Post<br>Hurst Road<br>Hassocks | N | 100 | 22.3 [(1)] | Relevant exposure |

[(1)] Only six months data for 2008. Estimated annual mean obtained using method shown in Box 3.2 of TG(09).

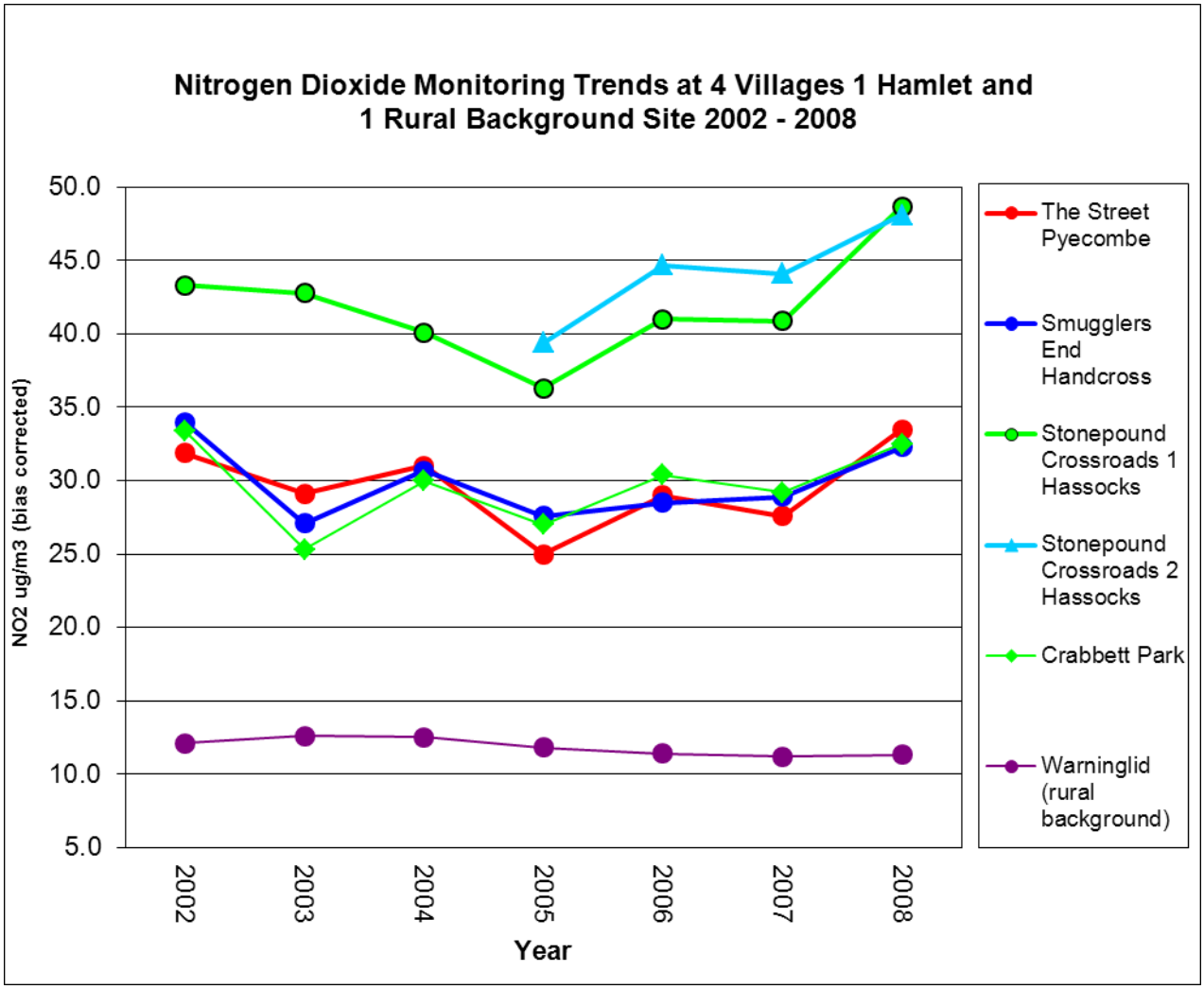
**Table 2.4b Annual mean concentrations (bias corrected) 2002 to 2008 of Nitrogen Dioxide Diffusion Tubes**

| Site ID | Location | Within AQMA ? | Annual mean concentrations ($\mu g/m^3$) Adjusted for bias | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| MSAQ1 | South Road Haywards Heath | N | 28.8 | 28.4 | 26.0 | 25.4 | 26.2 | 24.7 | 28.1 |
| MSAQ2 | Partly constructed Haywards Heath Relief Road | N | N/A | N/A | N/A | N/A | 14.5 | 14.5 | 14.7 |
| MSAQ3 | London Road East Grinstead | N | 42.3 | 38.8 | 42.5 | 39.1 | 40.2 | 40.3 | 44.5 |
| MSAQ4 | Court Close East Grinstead | N | N/A | 25.5 | 26.4 | 22.4 | 22.6 | 22.5 | 23.1 |
| MSAQ5 | Lewes Road East Grinstead | N | N/A | N/A | 40.1 | 35.1 | 37.6 | 37.2 | 40.5 |
| MSAQ6 | Smugglers End Handcross | N | 34.0 | 27.1 | 30.7 | 27.6 | 28.5 | 28.9 | 32.3 |
| MSAQ7 | Crabbet Park Worth | N | 33.4 | 25.3 | 30.0 | 27.0 | 30.4 | 29.2 | 32.5 |
| MSAQ8 | Pyecombe Street Pyecombe | N | 31.9 | 29.1 | 31.0 | 25.0 | 29.0 | 27.6 | 33.5 |
| MSAQ9 | Water Tower Colwood Lane Warninglid | N | 12.1 | 12.6 | 12.5 | 11.8 | 11.4 | 11.2 | 11.3 |
| MSAQ10 | Stonepound 1 Keymer Road Hassocks | N | 43.3 | 42.8 | 40.1 | 36.3 | 41.0 | 40.9 | 48.7 |
| MSAQ11 | Stonepound 2 Keymer Road Hassocks | N | N/A | N/A | N/A | 39.4 | 44.7 | 44.1 | 48.1 |

**Graph 2.4 a** **Annual mean concentrations (bias corrected) 2002 to 2008 of nitrogen dioxide measured at 4 urban centre sites**



**Graph 2.4 b** **Annual mean concentrations (bias corrected) 2002 to 2008 of nitrogen dioxide measured at 4 Villages 1 Hamlet and 1 Rural Background site**



### 2.2.2 $PM_{10}$

Particulate matter is of major health concern, as it has been linked with both increased morbidity and premature mortality. There is a wide range of emission sources that contribute to $PM_{10}$ concentrations in the UK. Research studies have confirmed that these emissions are divided into three categories

1. Primary particles - emissions from combustion sources including road traffic, power generation, industrial processes etc
2. Secondary particles - are formed by chemical reactions in the atmosphere and comprise principally of sulphates and nitrates
3. Coarse particles - emissions from a wide range of sources including re-suspended dusts from road traffic, construction works, mineral extraction etc.

As detailed in the Progress Report 2008, Mid Sussex District Council does not have a monitoring site for $PM_{10}$ in the District.
However, the Sussex Network contains 7 permanent automatic TEOM monitors. To date the air quality objective for $PM_{10}$ has not been exceeded across Sussex and therefore it is unlikely that it will be exceeded in future years in Mid Sussex as no new industrial developments are currently planned in the District.

### 2.2.3 Sulphur Dioxide

Sulphur dioxide is an acute respiratory irritant, hence the short averaging time for its objective. The main source of sulphur dioxide in the UK is power stations. There are also significant emissions from other industrial processes.

Automatic sulphur dioxide monitoring is undertaken at two permanent stations in Sussex located in Hove (roadside) and Lullington Heath (rural). Recent data from the stations does not indicate any exceedence of the national objectives. As no new industrial sources or sources with substantially increased emissions have been identified and local knowledge indicates that there are no significant increase in domestic sources, it is therefore concluded that the sulphur dioxide objective is not likely to be exceeded in the Mid Sussex Area.

### 2.2.4 Benzene

Benzene is a known human carcinogen and also contributes to the formation of ground level ozone. The main source of benzene emissions in the UK are petrol vehicles, petrol refining, and the fuel distribution from those petrol stations without vapour recovery systems.
Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1% from the previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol.

Monitoring of benzene has been undertaken between 1997/2005 across the district.
The results considered in the Updating & Screening Assessment 2003 and the Progress Reports for 2004 and 2005 indicated the benzene objective would not be exceeded in the future.

# 3 Road Traffic Sources

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

Mid Sussex 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

Mid Sussex 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.

Mid Sussex confirms that there are no new/newly identified roads with high flows of buses and/or HGVs.

## 3.4 Junctions

Mid Sussex confirms that there are no new/newly identified busy junctions/busy roads.

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

Mid Sussex confirms that there are no new/proposed roads.

## 3.6 Roads with Significantly Changed Traffic Flows

Mid Sussex confirms that there are no new/newly identified roads with significantly changed traffic flows.

## 3.7 Bus and Coach Stations

Mid Sussex confirms that there are no relevant bus and coach stations in the Local Authority area.

# 4 Other Transport Sources

## 4.1 Airports

Mid Sussex confirms that there are no airports in the Local Authority area.

## 4.2 Railways (Diesel and Steam Trains)

### 4.2.1 Stationary Trains

Mid Sussex 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

Mid Sussex 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)

Mid Sussex confirms that there are 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 for which an Air Quality Assessment has been Carried Out

Mid Sussex 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

Mid Sussex 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.

### 5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Mid Sussex 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.

## 5.2 Major Fuel (Petrol) Storage Depots

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

## 5.3 Petrol Stations

Mid Sussex confirms that there are no petrol stations meeting the specified criteria.

## 5.4 Poultry Farms

Mid Sussex confirms that there are no poultry farms meeting the specified criteria.

# 6 Commercial and Domestic Sources

## 6.1 Biomass Combustion – Individual Installations

Mid Sussex confirms that there are no biomass combustion plant in the Local Authority area.

## 6.2 Biomass Combustion – Combined Impacts

Mid Sussex confirms that there are no biomass combustion plant in the Local Authority area.

## 6.3 Domestic Solid-Fuel Burning

Mid Sussex confirms that there are no areas of significant domestic fuel use in the Local Authority area.

# 7 Fugitive or Uncontrolled Sources

Mid Sussex confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

# 8 Conclusions and Proposed Actions

## 8.1 Conclusions from New Monitoring Data

In the Progress Report 2008 two sites with relevant exposure at Stonepound crossroads, Hassocks where identified as exceeding the annual mean for nitrogen oxide.
In July 2008 additional sites were set up on the approach roads to Stonepound Crossroads.
The monitoring results, adjusted for the calender year of 2008, have identified 3 further exceedences, with one site having relevant exposure.

## 8.2 Proposed Actions

This report, which includes the assessment of additional monitoring for $NO_2$ at Hassocks, has confirmed the need to proceed with a Detailed Assessment for nitrogen dioxide at the Stonepound crossroads area and the approach roads.

The area was assessed for a suitable site to install the Sussex Air mobile laboratory.
Following this assessment only two locations were identified. Of these, one site has refused permission and we are still awaiting an answer from the other.
The laboratory needs to be installed without disturbing traffic flow and also requires an electricity supply. It appears obtaining automatic continuous monitoring data will prove not to be feasable.
Therefore the Detailed Assessment is likely to involve modelling and continued monitoring using diffusion tubes.

At present we are awaiting traffic flow data from West Sussex County Council and intend to use a new more accurate model software (ADMS Urban) purchased by Sussex Air to assist in our assessment. This is due to be operational in September 2009.
Traffic Counts by the Transport Planning Team at West Sussex County Council are to be undertaken in June 2009.

# 9 References

DEFRA (2002) The Air Quality (England) (Amendment) Regulations. HMSO.

DEFRA (2003) The Air Quality Strategy for England, Scottland, Wales and Northern Ireland: Addendum. HMSO.

DETR (2000) The Air Quality (England) Regulations. HMSO.

DETR (2000) The Air Quality Strategy for England, Scottland, Wales and Northern Ireland. HMSO.

DEFRA (2009) Local Air Quality Management Policy Guidance. LAQM.PG(09)

DEFRA (2009) Local Air Quality Management Technical Guidance. LAQM.TG(09)

DEFRA (2009) Local Air Quality Management Technical Guidance, FAQs relative to USA 2009
http://www.uwe.ac.uk/aqm/review/index.html

APEG (1999) Source apportionment of airborne particulate matter in the United Kingdom.
Report of the Airborne Particles Expert Group.

The Environment Act (1995)

The Environmental Protection Act (1990)

# Appendices

## Appendix 1: QA/QC Data

The laboratory suppling $NO_2$ diffusion tubes is Bristol City Scientific Services

Tube preparation: Tubes are prepared using 50µl of 20% triethanolamine in water.

The tube preparation and subsequent analysis follow the procedures in the harmonised "Practical Guidance" document.

Mid Sussex has not compared the diffusion tubes with the reference method in a colocation study.

The bias adjustment factor being applied is 0.87 and came from Spreadsheet Version Number: 05/09 on the Review and Assessment website.

Results of Bristol City Scientific Services Laboratory Precision

**Checking Precision and Accuracy of Triplicate Tubes**

AEA Energy & Environment
From the AEA group

| Diffusion Tubes Measurements | | | | | | | | | | Automatic Method | | Data Quality Check | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Start Date dd/mm/yyyy | End Date dd/mm/yyyy | Tube 1 µgm$^{-3}$ | Tube 2 µgm$^{-3}$ | Tube 3 µgm$^{-3}$ | Triplicate Mean | Standard Deviation | Coefficient of Variation (CV) | 95% CI of mean | Period Mean | Data Capture (% DC) | Tubes Precision Check | Automatic Monitor Data |
| 1 | 03/01/2008 | 30/01/2008 | 150.9 | 154.0 | 159.6 | 155 | 4.4 | 3 | 11.0 | 130 | 99.4 | Good | Good |
| 2 | 30/01/2008 | 27/02/2008 | 145.9 | 140.0 | 145.2 | 144 | 3.2 | 2 | 8.0 | 138 | 98.7 | Good | Good |
| 3 | 27/02/2008 | 02/04/2008 | 130.6 | 130.9 | 128.3 | 130 | 1.4 | 1 | 3.5 | 117 | 99.2 | Good | Good |
| 4 | 02/04/2008 | 30/04/2008 | 141.0 | 129.7 | 141.1 | 137 | 6.6 | 5 | 16.3 | 120 | 99.4 | Good | Good |
| 5 | 30/04/2008 | 29/05/2008 | 125.8 | 120.6 | 120.4 | 122 | 3.1 | 3 | 7.6 | 100 | 95 | Good | Good |
| 6 | 29/05/2008 | 03/07/2008 | 123.5 | 117.5 | 124.4 | 122 | 3.8 | 3 | 9.3 | 106 | 99.6 | Good | Good |
| 7 | 03/07/2008 | 01/08/2008 | 114.2 | 115.9 | 113.7 | 115 | 1.2 | 1 | 2.9 | 126 | 99.4 | Good | Good |
| 8 | 01/08/2008 | 03/09/2008 | 112.9 | 123.0 | 123.0 | 120 | 5.8 | 5 | 14.5 | 128 | 98.4 | Good | Good |
| 9 | 03/09/2008 | 01/10/2008 | 110.3 | 90.7 | 111.4 | 104 | 11.6 | 11 | 28.9 | 108 | 99.4 | Good | Good |
| 10 | 01/10/2008 | 29/10/2008 | 114.4 | 124.0 | 137.8 | 125 | 11.8 | 9 | 29.2 | 138 | 99 | Good | Good |
| 11 | 29/10/2008 | 03/12/2008 | 99.8 | 97.4 | 100.3 | 99 | 1.6 | 2 | 3.9 | 90 | 99.2 | Good | Good |
| 12 | 03/12/2008 | 07/01/2009 | 96.5 | 76.6 | 102.0 | 92 | 13.4 | 15 | 33.2 | 88 | 99.5 | Good | Good |
| 13 | | | | | | | | | | | | | |

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

Overall survey --> Good precision | Good Overall DC

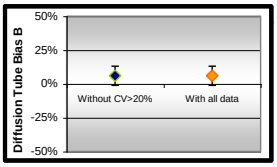
| Site Name/ ID: | Bristol - Field Intercomparison 2008 |
|---|---|

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

(Check average CV & DC from Accuracy calculations)

| Accuracy (with 95% confidence interval) without periods with CV larger than 20% | |
|---|---|
| Bias calculated using 12 periods of data | |
| Bias factor A | 0.95 (0.89 - 1.02) |
| Bias B | 5% (-2% - 13%) |
| Diffusion Tubes Mean: | 122 µgm$^{-3}$ |
| Mean CV (Precision): | 5 |
| Automatic Mean: | 116 µgm$^{-3}$ |
| Data Capture for periods used: | 99% |
| Adjusted Tubes Mean: | 116 (109 - 124) µgm$^{-3}$ |

| Accuracy (with 95% confidence interval) WITH ALL DATA | |
|---|---|
| Bias calculated using 12 periods of data | |
| Bias factor A | 0.95 (0.89 - 1.02) |
| Bias B | 5% (-2% - 13%) |
| Diffusion Tubes Mean: | 122 µgm$^{-3}$ |
| Mean CV (Precision): | 5 |
| Automatic Mean: | 116 µgm$^{-3}$ |
| Data Capture for periods used: | 99% |
| Adjusted Tubes Mean: | 116 (109 - 124) µgm$^{-3}$ |

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Version 03 - November 2006

Results of Bristol City Scientific Services WASP scheme

## WASP Results Lab 152 Round 97 onwards:

| Round | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 |
|---|---|---|---|---|---|---|---|---|
| Tube 1 (µg $NO_2$) | 0.890 | 1.865 | 2.085 | 1.358 | 0.949 | 1.489 | 1.178 | 1.179 |
| Tube 2 (µg $NO_2$) | 1.573 | 1.228 | 2.093 | 1.474 | 2.576 | 1.431 | 0.916 | 1.108 |
| Tube 3 (µg $NO_2$) | 1.582 | 1.857 | 0.885 | 1.354 | 1.813 | 2.307 | 0.934 | 1.840 |
| Tube 4 (µg $NO_2$) | 0.914 | 1.217 | 0.879 | 1.467 | 0.914 | 1.960 | 1.071 | 1.960 |
| | | | | | | | | |
| Spike tube 1 (µg NO2) | 0.890 | 1.830 | 2.150 | 1.360 | 0.920 | 1.370 | 1.220 | 1.220 |
| Spike tube 2 (µg NO2) | 1.580 | 1.190 | 2.150 | 1.470 | 1.860 | 1.370 | 0.940 | 1.220 |
| Spike tube 3 (µg NO2) | 1.580 | 1.830 | 0.840 | 1.360 | 1.860 | 2.280 | 0.940 | 2.020 |
| Spike tube 4 (µg NO2) | 0.890 | 1.190 | 0.840 | 1.470 | 0.920 | 2.280 | 1.220 | 2.020 |
| | | | | | | | | |
| Standardised result tube 1 | 1.000 | 1.019 | 0.970 | 0.999 | 1.032 | 1.087 | 0.966 | 0.966 |
| Standardised result tube 2 | 0.996 | 1.032 | 0.973 | 1.003 | 1.385 | 1.045 | 0.974 | 0.908 |
| Standardised result tube 3 | 1.001 | 1.015 | 1.054 | 0.996 | 0.975 | 1.012 | 0.994 | 0.911 |
| Standardised result tube 4 | 1.027 | 1.023 | 1.046 | 0.998 | 0.993 | 0.860 | 0.878 | 0.970 |
| | | | | | | | | |
| Performance index | 1.87 | 5.29 | 16.61 | 0.08 | 374.65 | 73.42 | 41.98 | 45.95 |
| Rolling performance index (NOT best of 4 out of 5) | | | | 5.96 | 99.16 | 116.19 | 122.53 | 134.00 |
| | | | | | | | | |
| Rolling performance index (best 4 out of 5) | | | | 5.96 | 5.96 | 23.85 | 33.02 | 40.36 |
| Performance classification (criteria from April 2009) | | | | Good | Good | Good | Good | Good |

Good =<56.25
Acceptable =<225
Unacceptable >225

# Appendix 2

**Monthly Average Results of Nitrogen Dioxide Diffusion Tubes**

| Site ID | Location | Monthly Average levels of $NO_2$ ($\mu g/m^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
| MSAQ1 | South Road Haywards Heath | 29.9 | 42.7 | 33.3 | 53.4 | 28.4 | 24.3 | 25.7 | 26.2 | 33.9 | 27.9 | 32.6 | 28.6 |
| MSAQ2 | Partly constructed Haywards Heath Relief Road | 17.1 | 27.5 | 15.4 | 16.1 | 16.7 | 8.9 | 9.5 | Spoilt | Spoilt | 17.6 | 18.9 | 20.9 |
| MSAQ3 | London Road East Grinstead | 48.3 | 61.2 | 58.6 | 55.0 | 41.2 | 55.6 | 48.2 | 40.1 | 42.5 | 55.1 | 53.0 | 55.4 |
| MSAQ4 | Court Close East Grinstead | 28.0 | 41.7 | 26.7 | 26.7 | 22.7 | 20.5 | 19.6 | 18.1 | 25.7 | 26.2 | 32.2 | 30.0 |
| MSAQ5 | Lewes Road East Grinstead | 52.6 | 57.9 | 41.8 | 45.6 | 45.8 | 34.1 | 46.8 | 38.8 | 46.0 | 52.5 | 52.5 | 44.1 |
| MSAQ6 | Smugglers End Handcross | 39.0 | 42.3 | 39.3 | 36.2 | 25.7 | 39.5 | 36.2 | 33.3 | 31.8 | 40.1 | 41.8 | 39.7 |
| MSAQ7 | Crabbet Park Worth | 45.1 | 43.2 | 42.7 | 38.1 | 22.6 | 34.0 | 40.8 | 31.4 | 29.8 | 42.3 | 39.5 | 38.8 |
| MSAQ8 | Pyecombe Stree Pyecombe | 44.3 | 51.8 | Lost | 48.6 | 34.9 | 26.0 | 35.6 | 38.1 | 33.3 | 42.0 | Lost | 30.3 |
| MSAQ9 | Water Tower Colwood Lane Warninglid | 10.3 | 26.4 | 11.8 | 13.4 | 12.1 | 8.3 | 7.8 | 7.0 | 13.0 | 11.8 | 16.5 | 17.5 |
| MSAQ10 | Stonepound 1 Keymer Road Hassocks | 38.2 | 66.0 | 50.1 | 56.0 | 85.1 | 55.3 | 55.3 | 39.8 | 66.5 | 53.5 | 58.5 | 47.8 |
| MSAQ11 | Stonepound 2 Keymer Road Hassocks | 58.5 | 62.3 | 51.6 | 62.4 | 67.7 | 57.7 | 50.5 | 44.4 | 52.3 | 55.2 | 52.9 | 48.3 |
| MSAQ12 | Bus Stop Keymer Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 57.0 | 29.3 | 57.9 | 56.9 | 59.4 | 51.6 |
| MSAQ13 | Lamp Post Keymer Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 46.0 | 37.6 | 58.1 | 50.5 | 47.7 | 50.5 |
| MSAQ14 | Bus Stop London Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 49.9 | 54.0 | 48.5 | 51.0 | 36.9 | 45.2 |
| MSAQ15 | Traffic Light Sign London Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 39.5 | 40.1 | 52.8 | 47.0 | 43.0 | 42.4 |
| MSAQ16 | Façade of residential premises Brighton Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 28.0 | 21.6 | 30.6 | 30.8 | 33.7 | 33.5 |
| MSAQ17 | Lamp Post Brighton Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 22.5 | 20.6 | 37.6 | 27.4 | 29.3 | 30.4 |
| MSAQ18 | Bus Stop Brighton Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 37.5 | 33.5 | 32.2 | 33.4 | 46.5 | 32.6 |
| MSAQ19 | Lamp Post Hurst Road Hassocks | N/A | N/A | N/A | N/A | N/A | N/A | 21.3 | 17.1 | 24.0 | 25.6 | 29.2 | 32.7 |

***Mid Sussex District Council***

# Appendix 3

**Map of all $NO_2$ monitoring areas in Mid Sussex**