**Air Quality Monitoring: Joint Report by RBBC and BAAG for 2011.**

1. The following report presents the results from the 2011 air pollution monitoring program undertaken on, and in the vicinity of, Gatwick Airport.

2. Committee members are reminded that details of:
   - the legislation,
   - the rationale for the monitoring of certain pollutants,
   - and factors to bear in mind when examining the data e.g. the impact of the weather, and / or changes in the source of a pollutant, were covered in a separate report to the GP sub committee on 11th January 2007.

**Off Airport Monitoring at Relevant Receptors on the Horley Gardens Estate.**
**Annual Compliance Monitoring – Nitrogen Dioxide.**

3. The annual average concentration of nitrogen dioxide across the Horley Gardens Estate in 2011 is shown in Figure 1.

4. Concentrations were below the UK annual average objective of 40 µg $m^{-3}$ (micrograms per cubic metre), and so the UK air quality standards were met within the Horley air quality management area (AQMA) in 2011.

5. The highest concentrations measured on the Horley Gardens Estate were 28.8 µg $m^{-3}$ at the RG2 site towards the southern end of The Crescent, next to the 'worst case' receptor at RB59, and 28 µg $m^{-3}$ on Cheyne Walk.

6. Local sources of pollution on the estate remained unchanged throughout 2011, and so the results are comparable to previous years monitoring work.

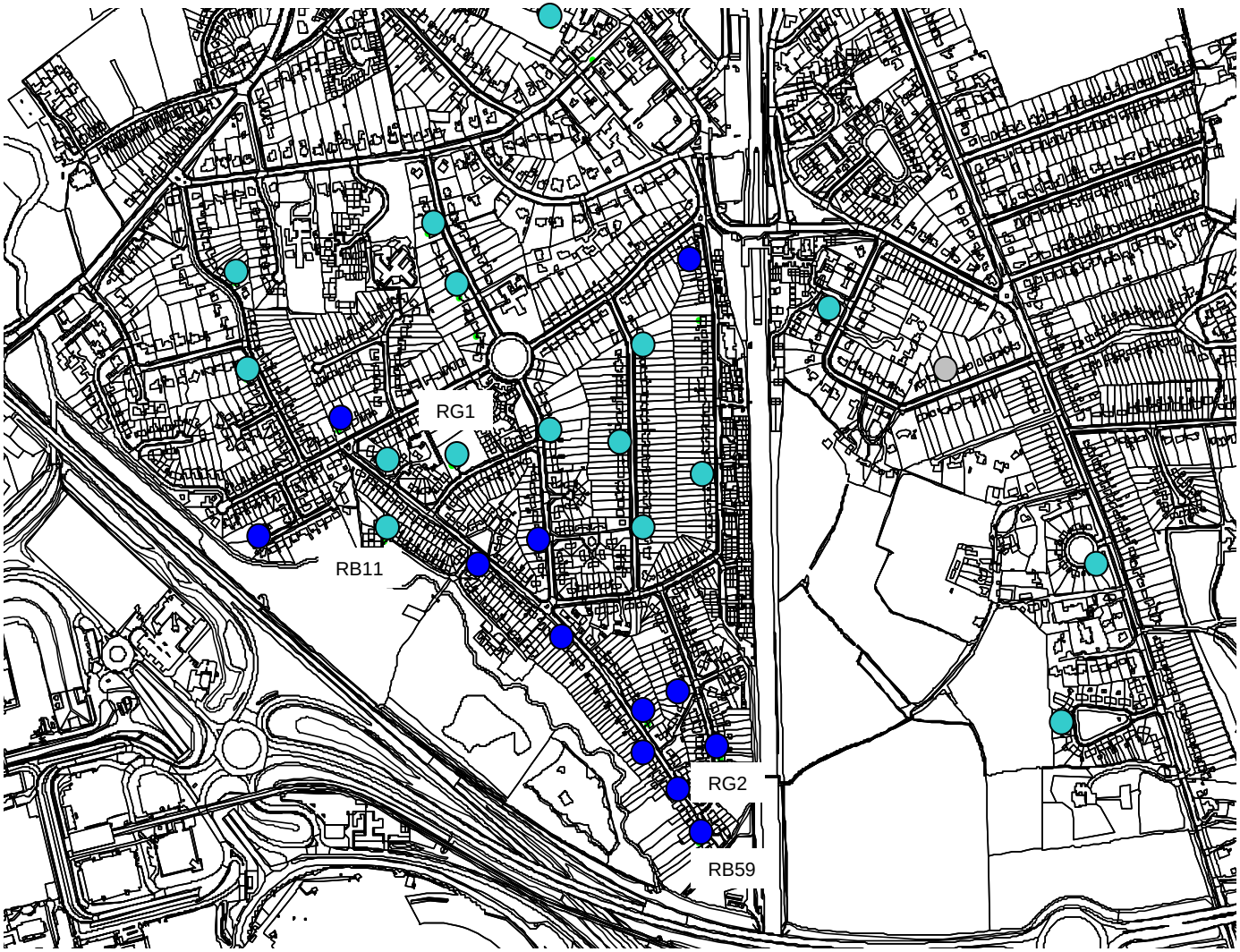
7. Data capture from the real time monitoring site RG1 was 99.0 %, and from site RG2 88.5 %, and so the data from these sites along with the diffusion tube data is valid for compliance monitoring purposes. As data capture at the RG2 site was less than 90 % the values here cannot be compared to the hourly air quality standard, but as the annual average standard is the main cause for concern the slightly lower data capture at RG2 has no impact on the findings of this report.

8. The results from 2011 are in line with the predicted distribution of nitrogen dioxide concentrations for the Horley Gardens Estate, with the highest concentrations found towards the southeast corner of the estate. Concentrations in 2011 were typically around 5 to 6 µg $m^{-3}$ lower than in 2010 across much of the Gardens Estate and Hookwood, although similar falls were seen elsewhere across Reigate and Banstead and Mole Valley. Thus the improvements seen in the vicinity of the airport reflect the natural year to year variation due to the weather and / or regional changes rather than a specific change related to the airport.

9. Despite the reduction in nitrogen dioxide concentrations at the majority of sites near the airport and elsewhere, pollutant concentrations in Charlwood rose by 2 µg $m^{-3}$ in 2011, although this site continues to record the lowest pollutant concentrations around the airport.

10. Passenger numbers and aircraft movements at Gatwick increased by 7.3 % and 4.4 % respectively in 2011 compared to 2010 (Appendix A), the first increase in three years. However passenger numbers and aircraft movements still remain below the 2007 peak by 4.4 % and 6 % respectively, which reduces nitrogen dioxide concentrations[1] at the worst affected properties by 1 to 2 µg $m^{-3}$. Traffic flows on the M23 spur remain 12 % below the 2006 peak.

[1] Netcen FAST modelling for GAL (2006). Modelling approach has since changed but the original model is still appropriate for indicative values.






**Key:**

- 15.1 to 20 µg m$^{-3}$
- 20.1 to 25 µg m$^{-3}$
- 25.1 to 30 µg m$^{-3}$
- 30.1 to 35 µg m$^{-3}$
- 35.1 to 40 µg m$^{-3}$
- 40.1 to 45 µg m$^{-3}$

North

0 250 m

Other sites in the vicinity of the Of the Airport:

| | |
|---|---|
| Charlwood: (Russ Hill) | 16 µg m$^{-3}$ |
| Hookwood: (Withey Meadows) | 19 µg m$^{-3}$ |
| Smallfield: (Ontario Close) | 29 µg m$^{-3}$ |

Comparable sites elsewhere within the Borough:

| | |
|---|---|
| Reigate: | 20 µg m$^{-3}$ |
| Banstead: | 18 µg m$^{-3}$ |
| Redhill: | 16 µg m$^{-3}$ |
| Merstham: | 25 µg m$^{-3}$ |

**Figure 1: Monitoring Results for Nitrogen Dioxide Concentrations across the Horley Gardens Estate in 2011.**

Tube Correction Factor = 0.95 (n=9 min).

**Annual Compliance Monitoring – $PM_{10}$.**

11. The $PM_{10}$ air quality standard was met on the Horley Gardens Estate in 2011, with an annual average concentration at RG1 of 22 µg $m^{-3}$, which was within the expected range of 18 to 23 µg $m^{-3}$. Although concentrations in 2011 were slightly higher than in 2010 this increase reflects year to year changes due to the prevailing weather conditions rather than any increase in local sources of $PM_{10}$.

**Trends in Pollutant Concentrations.**
**Nitrogen dioxide.**

12. A three year rolling average concentration is used in the trend analysis work, to help remove the year to year fluctuations in concentrations caused by the prevailing weather conditions. The data to date (Figure 2) shows that the long term downward trend in annual average nitrogen dioxide concentrations at the RG1 site has continued in 2011, after the slight 'pause' in 2010.

13. At the 'worst case' receptors closer to the airport (RG2, RB59) the downward trend has also continued in 2011, even with the increase in passenger traffic through the airport.

14. This downward trend at RG1 and RG2/RB59 is as expected given that computer modelling indicates that non airport sources of nitrogen dioxide and airport related road traffic emissions are predicted to fall until 2015[2] and to a lesser extent 2025[3], driven mainly by improvements in road vehicle engine technology. In addition the significant falls in passenger numbers and aircraft movements at Gatwick since the 2007 peak will have lead to further improvements in air quality especially at the RG2/RB59 sites.

**$PM_{10}$.**

15. It is important to note that the airport is not a significant source of $PM_{10}$, and computer modelling[4] consistently indicates that the airport is responsible for no more than 1 – 2 µg $m^{-3}$ of the total $PM_{10}$ concentration at the worst affected properties on the Horley Gardens Estate.

16. The main purpose of monitoring $PM_{10}$ on the Horley Gardens Estate is to examine trends in the $PM_{10}$ concentration, as the UK Government is aiming to reduce people's exposure to particulate matter in the longer term even where the air quality standards are met.

17. Using a three year rolling average to examine the trends in the data there is evidence of an overall downward trend from 2003 to 2011, with concentrations of 23.9 µg $m^{-3}$ in 2003 and 19.7 µg $m^{-3}$ in 2011 (Figure 3), although much of this improvement in non airport $PM_{10}$ to date has occurred between 2007 and 2010. The apparent levelling off in the trend in 2011 is more likely a reflection of the elevated concentrations measured in 2011, rather than the start of a long term change in the overall trend.

[2] Gatwick Air Quality Assessment for 2010 (AEAT/ENV/R/2795/Issue 1 – June 2009)
[3] Gatwick Airport Master Plan: Air Quality Assessment 2024/25 (AEAT/ENV/R/3139/Issue 1 – 18th May 2011)
[4] Gatwick Air Quality Assessment for 2010 (AEAT/ENV/R/2795/Issue 1 – June 2009)

**Figure 2: Three year Rolling Annual Average Nitrogen Dioxide Concentration at RG1, Michael Crescent Horley (Blue diamond), RG2, The Crescent Horley (Purple square), and RB59 (Red triangle).**

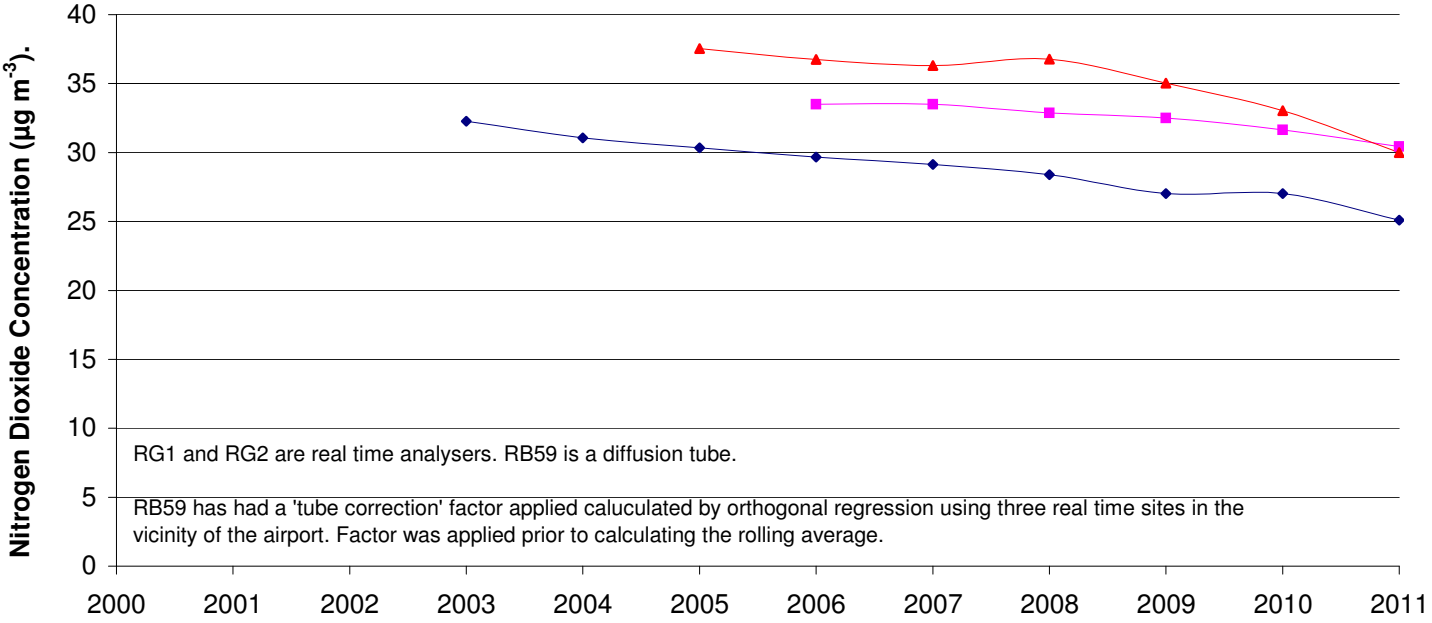
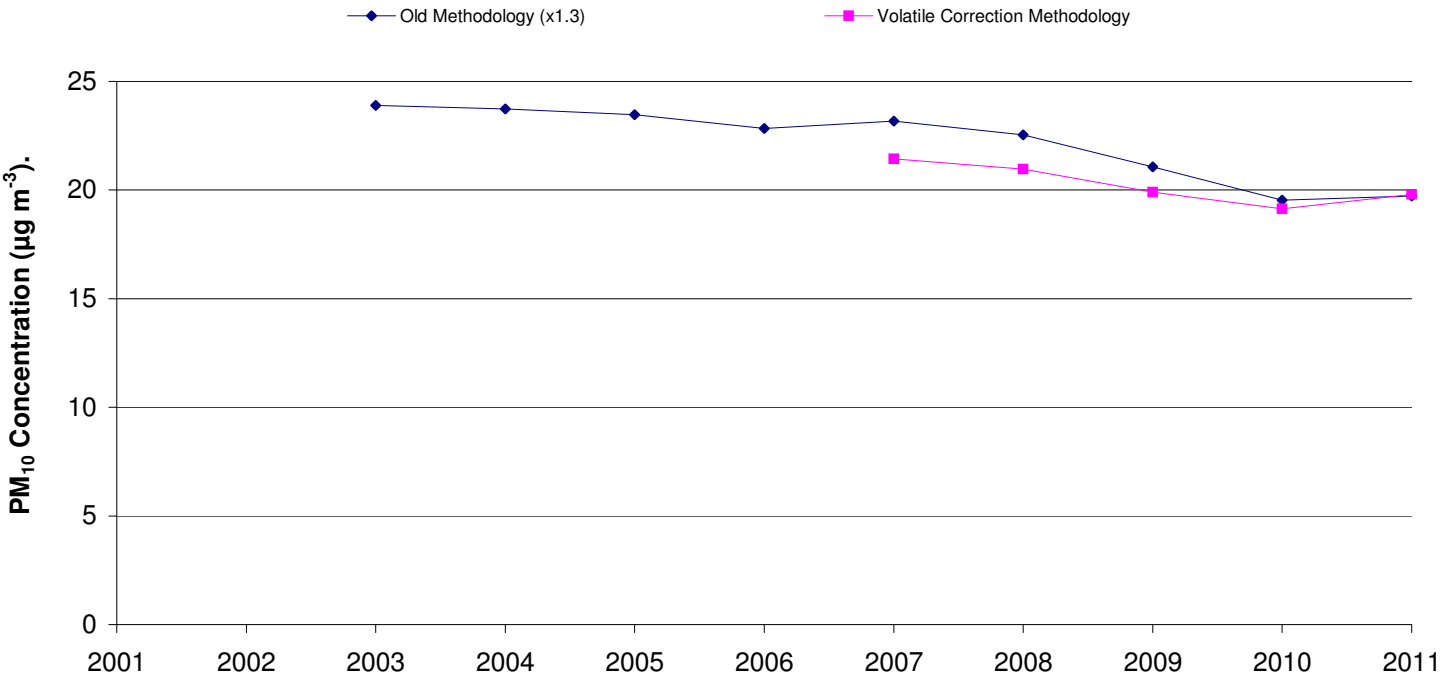



**Figure 3: Three Year Rolling Annual Average $PM_{10}$ Concentration at RG1, Michael Crescent, Horley.**



**On Airport Monitoring.**

18. In the absence of relevant receptors[5] at the airport monitoring sites, it is largely academic whether or not the air quality standards are breached. However the monitoring results from 2011 (Table 1) indicate that the standards were met at the LGW3 monitoring station for $PM_{10}$, carbon monoxide, and nitrogen dioxide.

| | On Airport (LGW3) | Standard | Standard Met? |
|---|---|---|---|
| Annual Average nitrogen dioxide Concentration | 32.3 | 40 | Yes |
| Nitrogen Dioxide: No. of hours over 200 µg $m^{-3}$ | 0 | 18 | Yes |
| Annual Average $PM_{10}$ Concentration (Volatile Correction Method) | 22.7 (23.0) | 40 | Yes |
| $PM_{10}$: No. of days over 50 µg $m^{-3}$ (Volatile Correction Method) | 1 (19) | 35 | Yes |
| Carbon Monoxide (Maximum daily running 8 hour mean) | 1.3 | 10 | Yes |
| All concentrations are in µg $m^{-3}$, except Carbon Monoxide mg $m^{-3}$. Data Capture: Nitrogen Dioxide 96.4 %, $PM_{10}$ 100 %, CO 98.3 %. | | | |

**Table 1: Nitrogen Dioxide, $PM_{10}$, and Carbon Monoxide Concentrations on Airport in 2011.**

19. It should be pointed out that while the LGW3 monitor is of limited use for compliance monitoring, it is of particular use for verifying the computer modelling work used to make forward predictions about air quality at the airport.

20. During 2011 there were no changes of note in the on airport sources of air pollution, aside from a general increase in passenger numbers and aircraft movements, and thus the results are comparable to 2010.

**On Airport Pollutant Trends.**

21. Figure 4 shows the 3 year rolling average nitrogen dioxide concentration at the on airport monitor LGW3, and the data from the residential monitor RG1 for comparison. The graph shows a steady improvement in nitrogen dioxide concentrations at the LGW3 monitor, with a significant improvement from 2003 onwards, followed by a subsequent increase in 2007 and 2008, while concentrations from 2009 to date continue to follow the long term downward trend.

22. The sudden fall in the annual average nitrogen dioxide concentrations in 2004 and 2005 (Table 2), which is reflected in the 3 year rolling average data (Figure 4), was noted but unexplained in the 2005 monitoring report (GP sub committee January 2007). Subsequent work indicated that the falls in 2004 and 2005 were more likely to have been due to the change in contractor servicing the equipment in 2003, than 'real' improvements in air quality on airport (GP sub committee June 2007), and this appeared to be confirmed by a rise in concentrations in 2006 when the original servicing agent was reappointed.

23. Annual mean nitrogen dioxide concentrations at LGW3 decreased by 4.5 µg $m^{-3}$ in 2011 although the on airport decline was comparable to that seen elsewhere in Reigate and Banstead, as with the increase of 2.5 µg $m^{-3}$ in 2010, and so reflects a regional decrease in pollution driven by the weather and / or regional sources rather than a decrease due to activities on the airport.

24. Figure 5 shows the three year rolling annual average $PM_{10}$ concentrations at the airport monitor, and $PM_{10}$ data from the residential monitor for comparison. The graph shows a steady improvement in $PM_{10}$ concentrations on airport until 2006, at which point concentrations remained largely static for a few years before resuming a downward trend which has continued in 2011.

[5] 'Relevant receptors' were discussed in the outline air quality paper presented to the GP sub committee in January 2007. However, for the purposes of this of this report relevant exposure can be taken as residential housing, or in the case of the 1 hour nitrogen dioxide objective where a member of the public might be present for 1 hour or more.

**Figure 4: Three Year Rolling Annual Average Nitrogen Dioxide Concentration at LGW3, Gatwick Airport.**

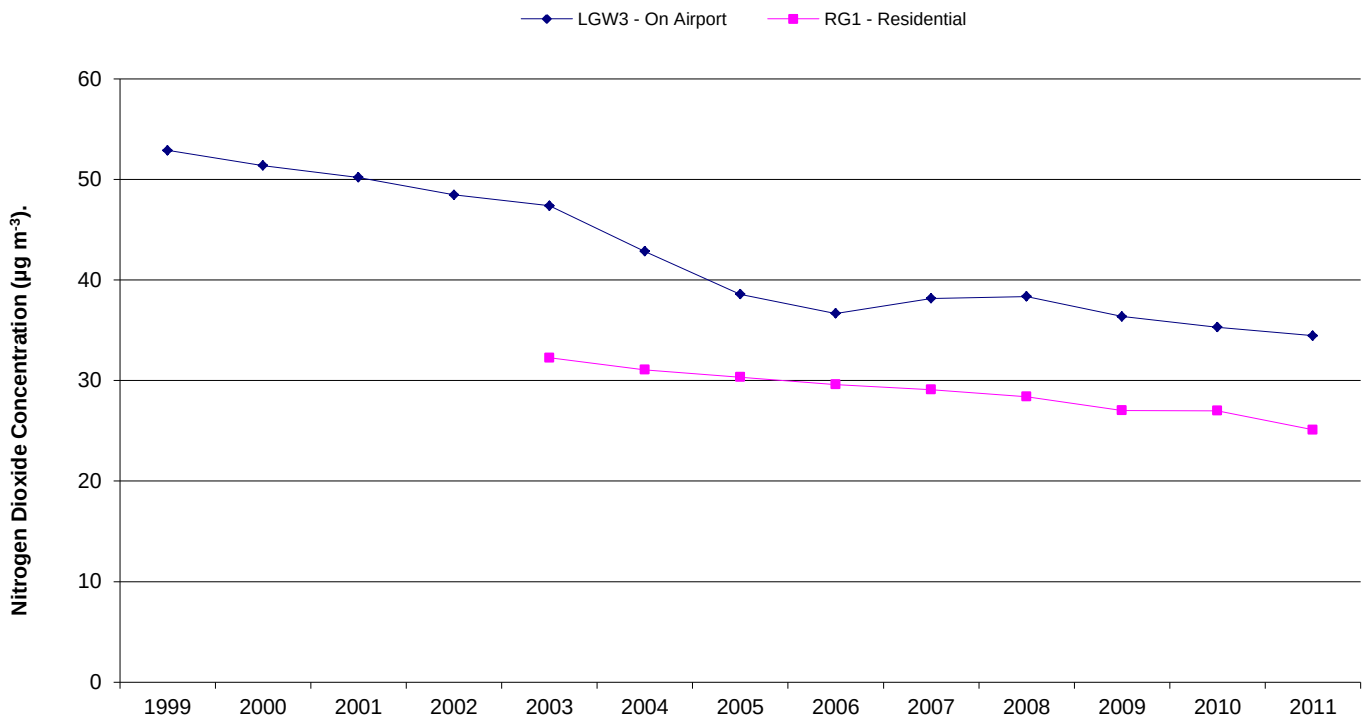
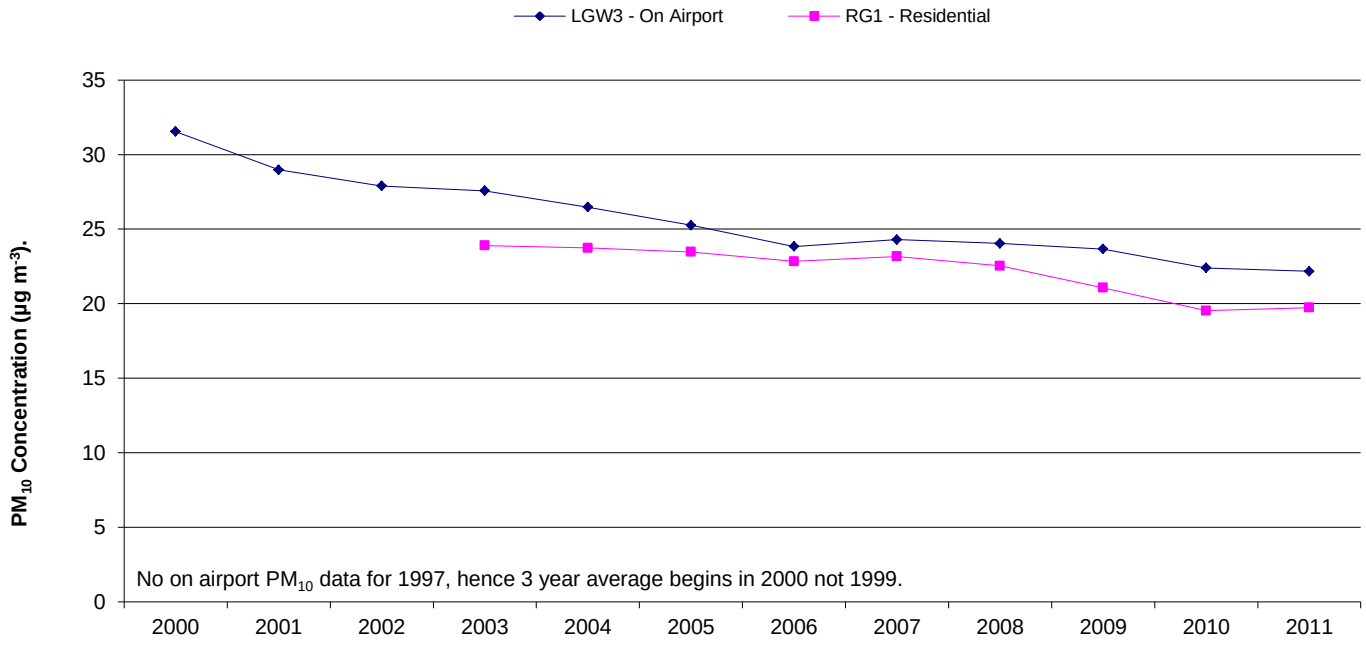



**Table 2: Annual and Three Year Annual Average Nitrogen Dioxide Concentrations (µg $m^{-3}$).**

| LGW3 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual Average | 53.8 | 52.6 | 52.3 | 49.2 | 49.1 | 47.0 | 46.0 | 35.5 | 34.2 | 40.3 | 40.0 | 34.8 | 34.3 | 36.8 | 32.3 |
| Data Capture | 94.9 | 89.2 | 93.3 | 93.4 | 93.5 | 96.1 | 94.0 | 95.4 | 96.7 | 96.3 | 94.2 | 96.8 | 93.7 | 99.2 | 96.4 |
| Hours Over 200 µg $m^{-3}$ | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 3 Year Rolling Average | LGW3 | | 52.9 | 51.4 | 50.2 | 48.5 | 47.4 | 42.9 | 38.6 | 36.7 | 38.2 | 38.4 | 36.4 | 35.3 | 34.5 |
| 3 Year Rolling Average | RG1 | | | | | | 32.3 | 31.1 | 30.3 | 29.6 | 29.1 | 28.4 | 27.0 | 27.0 | 25.1 |

**Figure 5: Three Year Rolling Annual Average $PM_{10}$ Concentration at LGW3, Gatwick Airport.**



**Benzene Monitoring Data.**

25. The concentration of benzene is measured at one residential site (RB11) on the Horley Gardens Estate and, contrary to the statement in last year's report, on airport at LGW3.

26. As expected measurements met the air quality standard in 2011 (Table 3), and were slightly lower than those measured in 2010. Due to the nature of the measurement technique it is difficult to compare values over the long term, but it is worth noting that residential benzene concentrations have fallen year on year since 2007.

| | Concentration ($\mu g\ m^{-3}$) | Standard | Standard Met? |
|---|---|---|---|
| Annual Average Benzene Concentration: Residential | 1.4 | 5 | Yes |
| Annual Average Benzene Concentration: On Airport | 0.51 | 5 | Yes |

**Table 3: Annual Average Benzene Concentrations on the Horley Gardens Estate at RB11 and Gatwick Airport (LGW3) in 2011 (Non pumped BTEX Tubes).**

**Additional Monitoring Data.**

**Ozone.**

27. Ozone monitoring began to the SW of the airport in 2005 at the RG3 site in Poles Lane Crawley. The aim of this site is to monitor long term trends in ozone concentrations in the vicinity of the airport.

28. Although the airport is not responsible for local ozone pollution, ozone plays an important role in the formation of nitrogen dioxide, which is the main pollutant of concern in the vicinity of the airport. Therefore examining the long term ozone trend is important for understanding nitrogen dioxide concentrations in both the short and longer term.

29. At present there are five years of data from the ozone monitor and based on a three year rolling average the overall trend to date is flat (data not shown).

30. Compared to the air quality standards ozone concentrations failed to meet the UK ozone objective for the 6$^{th}$ consecutive year, although the EU standard (which is less strict) was met in 2011 (Table 4).

| | Number of exceedences. | Standard Met? | |
|---|---|---|---|
| | | UK[a] | EU[b] |
| RG3: Poles Lane Crawley. | 29 / 6[b] | No | Yes |
| **Standards:** | | | |
| UK: Daily Max. of running 8 hour mean of 100 $\mu g\ m^{-3}$. | 10 max. | - | - |
| EU: Daily Max. of running 8 hour mean of 120 $\mu g\ m^{-3}$ (averaged over 3 years). | 25 max. | - | - |

[a] in 2011
[b] The EU standard is averaged over 3 years i.e. 2009, 2010, and 2011.

**Table 4: Number of exceedences of the Ozone standard in 2011.**

**Ultrafine Particle Concentrations in the vicinity of Gatwick.**

31. Particle concentrations traditionally have been measured using a mass based system, and particle measurements made around Gatwick are no exception to this. These measurements focus on particles under 10 µm in diameter (strictly aerodynamic diameter) known as $PM_{10}$, as these particles are deposited deep down inside the lungs.

32. However research over the past 10 to 15 years has consistently indicated that the finer particulate fractions, including particles under 0.1 µm in diameter known as ultrafines, tend to have the biggest biological effects especially when derived from combustion sources.

33. Recently two studies have been published[6,7] that have looked at the number and size distributions of ultrafine particles around airports in the US, in addition to an unpublished study in 2011 at Schiphol Airport in the Netherlands. All three studies suggest that aircraft are a significant source of the finest of the ultrafine particles especially during take off, and that the 'spike' in ultrafine particles can be detected at least 600 m from the airport.

34. At present there is no routine monitoring of ultrafine particle concentrations by local authorities or the airport, in part as there are currently no recognised health criteria or standards against which the results can be assessed.

35. However in late December a brief one day study was undertaken by RBBC to see how ultrafine particle numbers varied in the vicinity of the airport. This found (not unexpectedly) that particle numbers increased as measurements were made closer to the airport, in a pattern similar to that seen with the nitrogen dioxide concentrations.

36. On the day of sampling the particle number counts were no different at the worst affected properties to particle number counts at a monitoring site in central London, although it is important to stress that this was a one day study with a handheld instrument.

37. The routine measurement of ultrafine particle number and size distributions is a nascent field of air pollution research especially in the vicinity of airports, but any further developments or work at Gatwick will be reported back to the steering group.

[6] Atmospheric Environment 45 (2011) pp.6526 – 6533.
[7] Atmospheric Environment 50 (2012) pp.328 – 337.

**Summary.**

38. In summary:

i) The annual average air quality standard for nitrogen dioxide was met at relevant receptors in the vicinity of the airport during 2011 (Table 5), as were the air quality standards for other pollutants under the local authority air quality management regime (Table 5).

ii) Ozone concentrations in the vicinity of the airport did not meet the UK air quality standard for the 6$^{th}$ consecutive year, although the airport is not responsible for local ozone pollution.

iii) Trend analysis of the nitrogen dioxide concentrations at properties most at risk of breaching the air quality objective (RB59) show a downward trend over the last four years, while the long term downward trend at the 'background' site (RG1) resumed in 2011 after a pause in 2010. The long term decrease in pollution at the background site is most likely due to improvements in road vehicle emissions, while the more recent falls at the worst case receptor(s) reflect the significant falls in aircraft movements and passenger numbers between 2008 and 2010 together with the background improvements seen at RG1. The long term downward trend at the RG1 site is in line with predictions for non airport nitrogen dioxide pollution at Gatwick and across the southeast.

iv) The concentration of nitrogen dioxide measured on airport in 2011 at LGW3 meets the UK air quality objective of 40 µg m$^{-3}$. The concentrations of the other pollutants measured at LGW3 also met the relevant air quality standards.

v) The three year rolling annual average trend analysis of the on airport nitrogen dioxide concentrations shows a decrease in concentrations between 2008 and 2011, with concentrations in 2011 the lowest to date.

vi) The average $PM_{10}$ concentration measured on airport in 2011 showed a slight increase compared to 2010 (non VCM measurement), although this increase is unlikely to be related to the increase in passenger traffic at the airport as a similar increase was seen off airport.

vii) $PM_{10}$ measurements made using the volatile correction methodology (VCM) in 2011 were unusual, and similar to 2010, in that concentrations calculated using the VCM technique were higher than the measurements made using the 'old' technique unlike in previous years. This difference reflected an influx of semi volatile material from Europe in 2011, albeit smaller than in 2010, which the VCM method is designed to measure.

| | Measured value | Standard | Standard Met? |
|---|---|---|---|
| **Nitrogen Dioxide:** | | | |
| Highest measured annual average residential concentration. | 28.8 | 40 | Yes |
| Annual Average nitrogen dioxide concentration Airport monitor. | 32.3 | 40 | Yes |
| **$PM_{10}$:** | | | |
| Annual Average $PM_{10}$ Concentration: Residential Monitor. (VCM value) | 21.1 (21.7) | 40 | Yes |
| $PM_{10}$: No. of days over 50 µg $m^{-3}$: Residential Monitor. (VCM value) | 1 (9) | 35 | Yes |
| Annual Average $PM_{10}$ Concentration: Airport Monitor. (VCM value) | 22.7 (23.0) | 40 | Yes |
| $PM_{10}$: No. of days over 50 µg $m^{-3}$: Airport Monitor. (VCM value) | 1 (19) | 35 | Yes |
| **Benzene:** | | | |
| Residential Benzene Monitor (Site RB 11). | 1.4 | 5 | Yes |
| **Ozone:** | | | |
| RG3 Monitor to SW of Airport (Number of exccedences). | 29 | 10 | No |
| All concentrations are in µg $m^{-3}$. | | | |

**Table 5: Summary of Air Quality in the Vicinity of Gatwick Airport in 2011.**

**Appendix A.**

**Figure A.1: Passenger and Aircraft Movement Trends at Gatwick Airport.**

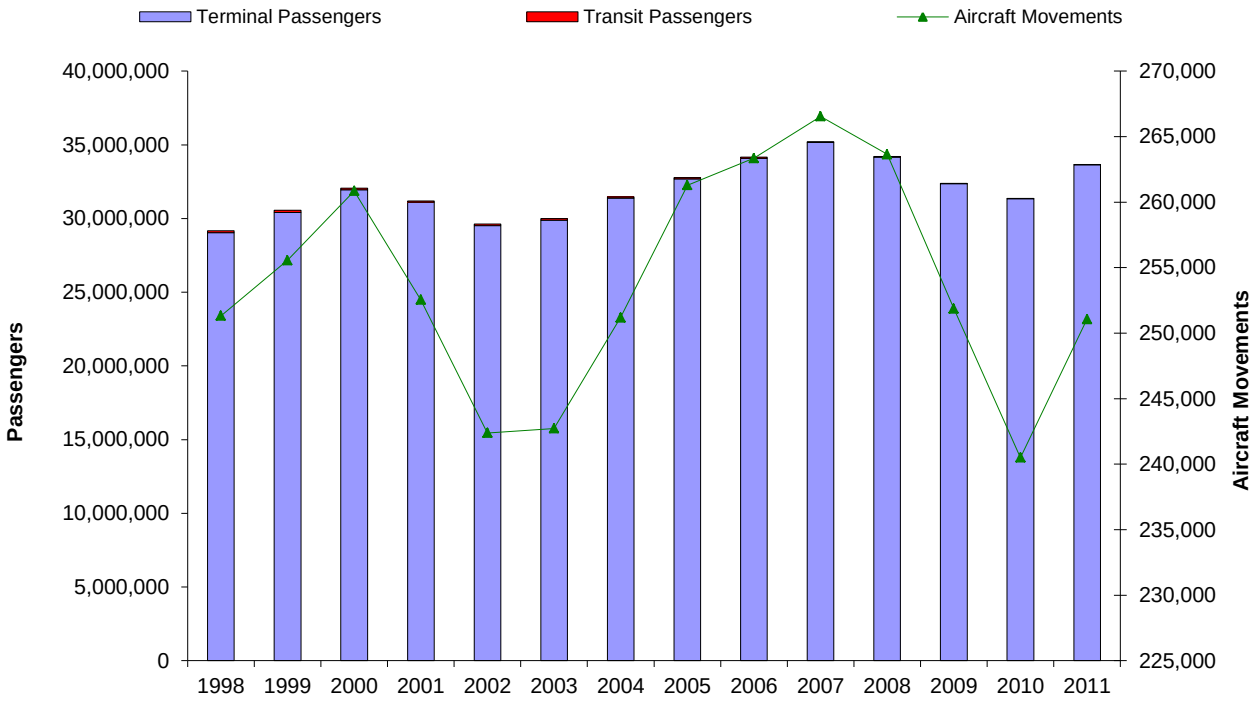



**Table A.1: Annual Passenger Numbers and Aircraft Movements at Gatwick Airport.**

| | Number of Passengers | | | No. of Aircraft Movements |
|---|---|---|---|---|
| | Terminal | Transit | Total | |
| 1998 | 29,032,838 | 140,292 | 29,173,130 | 251,321 |
| 1999 | 30,409,860 | 153,761 | 30,563,621 | 255,570 |
| 2000 | 31,947,524 | 119,601 | 32,067,125 | 260,859 |
| 2001 | 31,096,563 | 85,207 | 31,181,770 | 252,543 |
| 2002 | 29,517,894 | 109,515 | 29,627,409 | 242,379 |
| 2003 | 29,893,288 | 111,974 | 30,005,262 | 242,731 |
| 2004 | 31,391,352 | 75,418 | 31,466,770 | 251,195 |
| 2005 | 32,693,005 | 82,690 | 32,775,695 | 261,292 |
| 2006 | 34,080,345 | 83,234 | 34,163,579 | 263,363 |
| 2007 | 35,165,404 | 50,709 | 35,216,113 | 266,550 |
| 2008 | 34,162,014 | 43,873 | 34,205,887 | 263,653 |
| 2009 | 32,360,773 | 31,747 | 32,392,520 | 251,879 |
| 2010 | 31,342,263 | 33,027 | 31,375,290 | 240,500 |
| 2011 | 33,643,989 | 30,275 | 33,674,264 | 251,067 |

Data from Civil Aviation Authority. www.caa.co.uk/default.aspx?catid=80&pagetype=90

## Appendix B: Summary of Annual Monitoring Results 1999 to 2011.

**Nitrogen Dioxide**

| Site | Parameter | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RG1 | Ann. Average (µg $m^{-3}$) | - | - | 34.1 | 31.3 | 31.4 | 30.5 | 29.1 | 29.4 | 28.9 | 26.9 | 25.3 | 28.9 | 21.1 |
| RG2 | Ann. Average (µg $m^{-3}$) | - | - | - | - | - | 33.8 | 34.3 | 32.4 | 33.8 | 32.4 | 31.3 | 31.2 | 28.8 |
| RG3 | Ann. Average (µg $m^{-3}$) | - | - | - | - | - | - | - | 19.4 | 20.9 | 18.9 | 18.2 | 20.5 | 17.8 |
| LGW3 | Ann. Average (µg $m^{-3}$) | 52.3 | 49.2 | 49.1 | 47.0 | 46.0 | 35.5 | 34.2 | 40.3 | 40 | 34.8 | 34.3 | 36.8 | 32.3 |
| RB59 | Ann. Average (µg $m^{-3}$) | - | - | - | - | 40 | 39 | 34 | 37 | 38 | 35 | 32 | 32 | 26.0 |
| | | | | | | | | | | | | | | |
| RG1 | Data Capture (%) | - | - | 99.0 | 100.0 | 99.7 | 99.6 | 98.0 | 98.5 | 99.1 | 99.4 | 100.0 | 91.4 | 99 |
| RG2 | Data Capture (%) | - | - | - | - | - | 89.0 | 97.0 | 96.0 | 96.3 | 92.8 | 95.0 | 92.4 | 88.5 |
| RG3 | Data Capture (%) | - | - | - | - | - | - | - | 97.8 | 98.8 | 99.2 | 99.0 | 97.5 | 92.3 |
| LGW3 | Data Capture (%) | 93.3 | 93.4 | 93.5 | 96.1 | 94.0 | 95.4 | 96.7 | 96.3 | 94.3 | 96.8 | 93.7 | 99.2 | 96.4 |
| RB59 | Data Capture (%) | - | - | - | - | 91.6 | 100 | 91.6 | 100 | 100 | 100 | 100 | 100 | 91.6 |
| | | | | | | | | | | | | | | |
| RG1 | Hours Over 200 µg $m^{-3}$ | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RG2 | Hours Over 200 µg $m^{-3}$ | - | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0[b] |
| RG3 | Hours Over 200 µg $m^{-3}$ | - | - | - | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 |
| LGW3 | Hours Over 200 µg $m^{-3}$ | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| RB59 | Hours Over 200 µg $m^{-3}$ | - | - | - | - | - | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | | | | | | | | | | | | | | |
| **Particulate Matter ($PM_{10}$)** | | | | | | | | | | | | | | |
| RG1 | Ann. Average (µg $m^{-3}$) | - | - | 22.8 | 23.2 | 25.7 | 22.3 | 22.4 | 23.8 | 23.3 | 20.5 | 19.4 | 18.7[a] | 21.1 |
| | Ann. Average VCM* (µg $m^{-3}$) | | | | | | | | 21.2 | 22.0 | 19.7 | 18.0 | 19.7 | 21.7 |
| LGW3 | Ann. Average (µg $m^{-3}$) | 31.0 | 28.7 | 27.2 | 27.8 | 27.8*** | 23.8*** | 24.2*** | 23.3 | 25.3 | 23.4 | 22.3 | 21.6 | 22.7 |
| | Ann. Average VCM* (µg $m^{-3}$) | | | | | | | | 21.1 | 23.7 | 21.8 | 20.9 | 22.0 | 23 |
| | | | | | | | | | | | | | | |
| RG1 | Data Capture (%) | - | - | 99.7 | 100 | 99.5 | 100 | 100 | 99.4 | 99.3 | 99.0 | 100 | 73.1 | 97.8 |
| | Data Capture VCM** (%) | | | | | | | | 96.4 | 98.1 | 99.0 | 99.1 | 73.1 | 98.6 |
| LGW3 | Data Capture (%) | 91.5 | 92.9 | 97.3 | 99.2 | 97.3 | 97.3 | 97.3 | 96.2 | 95.1 | 93.4 | 85.7 | 97.2 | 100 |
| | Data Capture VCM** (%) | | | | | | | | 93.6 | 93.6 | 93.4 | 85.7 | 97.2 | 99.5 |
| | | | | | | | | | | | | | | |
| RG1 | No. days over 50 µg $m^{-3}$ | - | - | 6 | 6 | 16 | 0 | 3 | 5 | 9 | 4 | 0 | 0[b] | 1 |
| | No. days over 50 µg $m^{-3}$ (VCM) | | | | | | | | 6 | 18 | 5 | 2 | 0[b] | 9 |
| LGW3 | No. days over 50 µg $m^{-3}$ | 35 | 28 | 20 | 17 | 31*** | 10*** | 9*** | 7 | 18 | 13 | 0[b] | 3 | 1 |
| | No. days over 50 µg $m^{-3}$ (VCM) | | | | | | | | 10 | 23 | 16 | 2[b] | 4 | 19 |

Locations:

RG1 is located on the Horley Gardens Estate in Michael Crescent (NE of the Airport).

RG2 is located on the Horley Gardens Estate in The Crescent (NE of the Airport).

RG3 is located to the SW of the airport in Poles Lane, Crawley.

RB59 is a diffusion tube (not a real time site) located at the southern most end of the Horley Gardens Estate to the NE of the Airport.

*for details on volatile correction methodology see www.volatile-correction-model.info. Spreadsheets downloaded 05/05/09 for values to 2009. From 2009 data direct from London Air Website www.londonair.org.uk.

** as the VCM requires data from three other sites VCM data capture can be lower than from the site of interest.

*** figures have been revised down as data originally supplied for these 3 years was incorrect. Correction made in July 2010 report.

[a] data capture under 75 %. Therefore these values cannot be compared to the relevant air quality standard.

[b] data capture under 90 %. Therefore these values cannot be compared to the relevant air quality standard. Data shown will be minimum number of hours or days depending on standard.

**Abbreviations and Definitions**

| | |
|---|---|
| AQMA | Air Quality Management Area. |
| CO | Carbon Monoxide. |
| GAL | Gatwick Airport Limited. |
| $m^3$ | cubic metre. |
| mg | milligram (1 thousandth of a gram). |
| NETCEN | National Environmental Technology Centre, UK. |
| ng | nanogram (1 billionth of a gram). |
| nm | nanometre (1 billionth of a metre or 1 millionth of a millimetre) |
| $NO_2$ | Nitrogen Dioxide. |
| $NO_x$ | Oxides of Nitrogen (mainly NO and $NO_2$ expressed as $NO_2$ equivalent). |
| $O_3$ | Ozone. |
| PM | Particulate Matter. |
| $PM_{10}$ | Essentially particles under 10 µm in diameter. Officially defined as the size fraction below 10µm in aerodynamic diameter, which has a cut off point at 50% of the particles which are 10µm in aerodynamic diameter. |
| ppb | part(s) per billion. |
| ppm | part(s) per million. |
| TEOM | Tapered Element Oscillating Microbalance. (Device for measuring $PM_{10}$ concentrations in real time). |
| µg | microgram (1 millionth of a gram). |
| $\mu g/m^3$ | microgram(s) per cubic metre |
| $\mu g\ m^{-3}$ | microgram(s) per cubic metre, This scientifically is the correct form to use rather than $\mu g/m^3$, though either can be used. |
| µm | micrometre (1 millionth of a metre or 1 thousandth of a millimetre) |
| VCM | Volatile Correction Method. (used to correct $PM_{10}$ measurements made using a TEOM. This results in data equivalent to measurements made using the European Union's 'preferred' $PM_{10}$ monitoring technique. |