



Aviation

Farnborough Airport Ltd

Town and Country Planning Act Section 106/299A

**Environment Report Quarter 2
April – June 2008**

TAG Farnborough Airport Ltd
Farnborough
Hampshire
GU14 6XA

1. INTRODUCTION

1.1 In continued compliance with the requirements of the agreement in place under Sections 106 and 299A of the Town and Country Planning Act 1990 between TAG Farnborough Airport and Rushmoor Borough Council, TAG hereby submits a report for the second quarter of 2008, (April to June 2008) detailing results of environmental monitoring as required by that agreement. In line with the paragraph 2 (t), the content of this report was revised in consultation with Rushmoor Borough Council prior to the publication of the first quarter's report in 2007.

2. NOISE MONITORING

2.1 The two permanent noise monitoring terminals situated at Farnborough College and Tweseldown Racecourse remain in operation. The portable noise monitor is currently being utilised for noise monitoring in a range of locations, local to the airport, in connection with Quiet Flying Programme and associated Noise Abatement Trials.

2.2 Figures 1, 2 and 3 display L_{eq} data for correlated total noise levels (Total), aircraft events (Event) and background noise (Back), calculated as comparable A-weighted (dBA) values, by day of month and NMT for April, May and June respectively.

Figure 1: *Noise as L_{eq} Total, Event and Background, by Day of Month and Noise Monitoring Terminal, April 2008.*

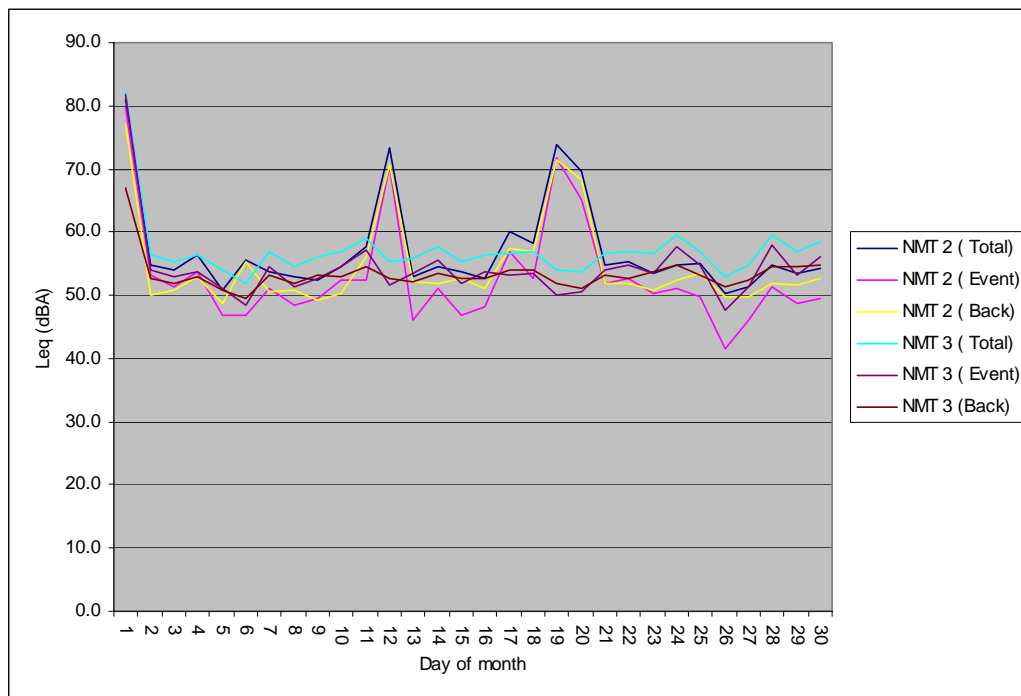


Figure 2: Noise as L_{eq} Total, Event and Background by day of month and Noise Monitoring Terminal, May 2008.

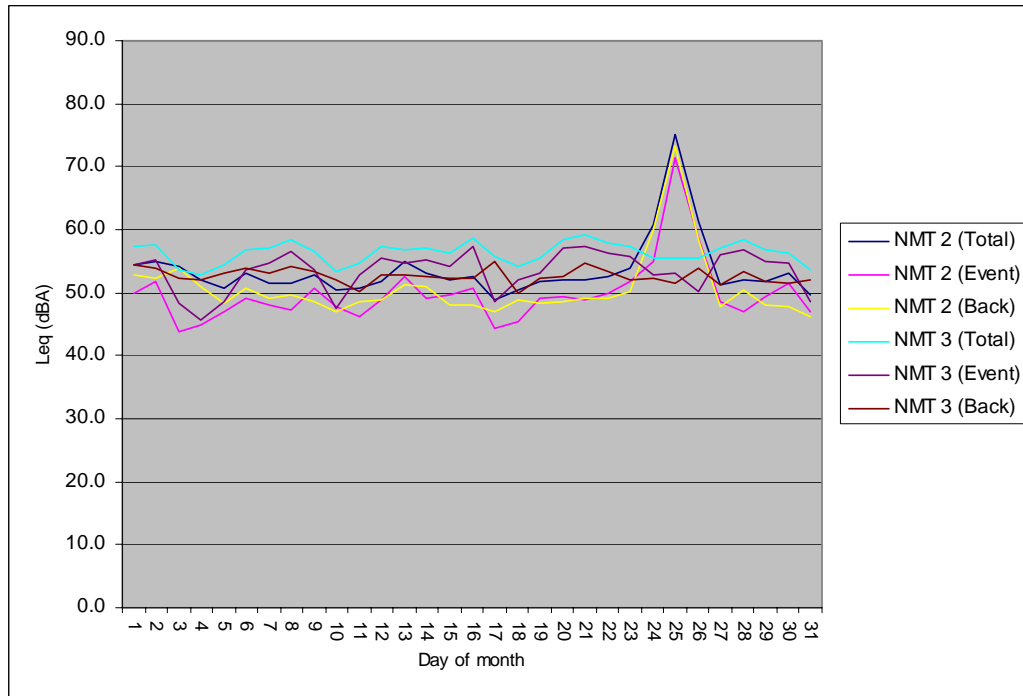
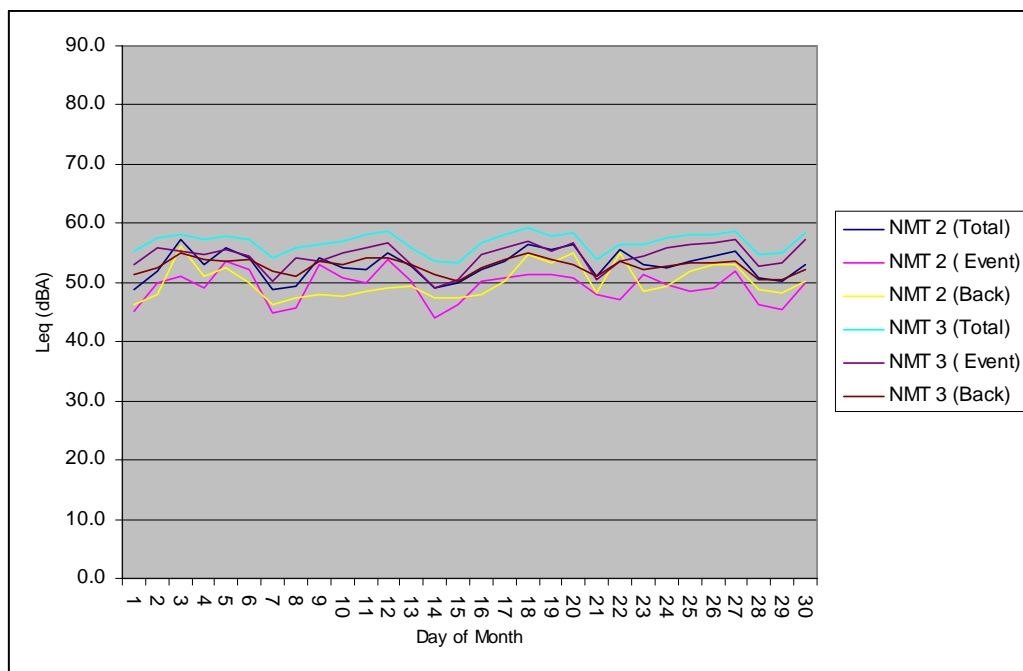


Figure 3: Noise as L_{eq} Total, Event and Background by day of month and Noise Monitoring Terminal, June 2008.



- 2.3 Noise contours produced using the FAA's Integrated Noise Model (INM) for operations covering the entire duration of 2007 were submitted to Rushmoor in mid February 2008 in accordance with the requirements of the agreement between TAG and Rushmoor. The results of the modelling exercise undertaken are given below in Table 1, along with those included with the planning agreement. Contours covering the period January - June 2008 are currently under preparation and will be supplied to Rushmoor Borough Council in mid August 2008 in accordance with clause 2o section c, of the Section 106 Planning Agreement.
- 2.4 The predicted noise contours for 2008 have been generated using 2007 actual movement data (flight tracks) with the assumption that over the duration of 2008 there will be a total of 30,000 movements. This 30,000 figure is derived from the permitted total of 28,000 with an additional 2,000 movements that relate to flights that are not required to be declared as part of the Planning Permission agreement (i.e. military, flying club, diversions etc).

Table 1: Results of INM Modelling exercise

Leq dB (A)	Control Contours Predicted 20,000 movements (1997 mix)	Actual Contours Jan to Dec 2007 (KM ²) (actual 2007 movements)	Predicted Contours Jan to Dec 2008 (KM ²) (30,000 movements 2007 fleet mix)
55	9.07	4.66	4.92
60	4.03	1.88	1.98
65	1.70	0.98	1.01

- 2.5 Use of the L_{eq} contour is internationally recognized as a means of noise measurement. A 66 dB(A) L_{eq16} indicates that the average level of noise during a 16 hour day is 66 dB(A). 66 dB(A) is quieter than the a car traveling at 38mph, heard from about 21 feet away, or from a washing machine.
- 2.6 The 55 dBA contour, used in agreement with Rushmoor, is below that deemed to be the trigger of "low annoyance" in the Wilson Committee Report (1963), a report traditionally used as a method of assessing the probability of annoyance due to aircraft noise. According to research by Schultz on reaction to noise, 55dB(A) calculated as a DNL (Day Night Level) is likely to cause less than 5% of the community becoming highly annoyed.

- 2.7 The FAA's INM along with ANCONII has been produced to comply with the requirements of ECAC -CEAC Document 29 as specified in the proposed European Noise Directive.
- 2.8 In accordance with the requirements of the Section 106 Agreement TAG has purchased the latest version of INM (INM 7.0), which was released at the end of April 2007. At present this latest edition of INM cannot be used due to an incompatibility issue in relation to the INM Link Program (which allows actual aircraft tracks to be used in the modelling process). This issue has been raised with and acknowledged by the producers of INM (Brüel & Kjær). Brüel & Kjær have since confirmed that INM Link will not be upgraded to support INM 7.
- 2.9 Due to the circumstances stated above, TAG has used INM version 6.2 in the latest assessment to examine aircraft derived noise data. This version remains compatible with the INM Link Program allowing actual track data to be used to model Noise Contours based on aircraft movements. Brüel & Kjær have stated that following their evaluation, INM Version 6.2 gives the same results as INM Version 7 within the expected accuracies of the INM model and typical input data.
- 2.10 Daily L_{eq} Figures are given in Appendix A.

3. AIRCRAFT MOVEMENTS

- 3.1 Table 2 shows aircraft movements for the second quarter 2008, by movement category. Figure 4 gives a summary of movements by category for weekdays and Figure 5 gives a summary of movements by category for weekends.

Table 2: Movements summary by type.

Category	April	May	June	Quarter 2, 2008	Total 2008
Business	2021	2430	2681	7132	12807
Helicopter	123	130	162	415	680
Subtotal (Planning Agreement Movements)	2144	2560	2843	7547	13487
Flying club	58	64	50	172	307
Military	14	8	10	32	63
Diversion	7	16	4	27	53
Other	59	55	62	176	432
SBAC	0	14	0	14	14
Total	2282	2717	2969	7968	14356

Figure 4: Percentage of Weekday Movements by Type, Quarter 2, 2008

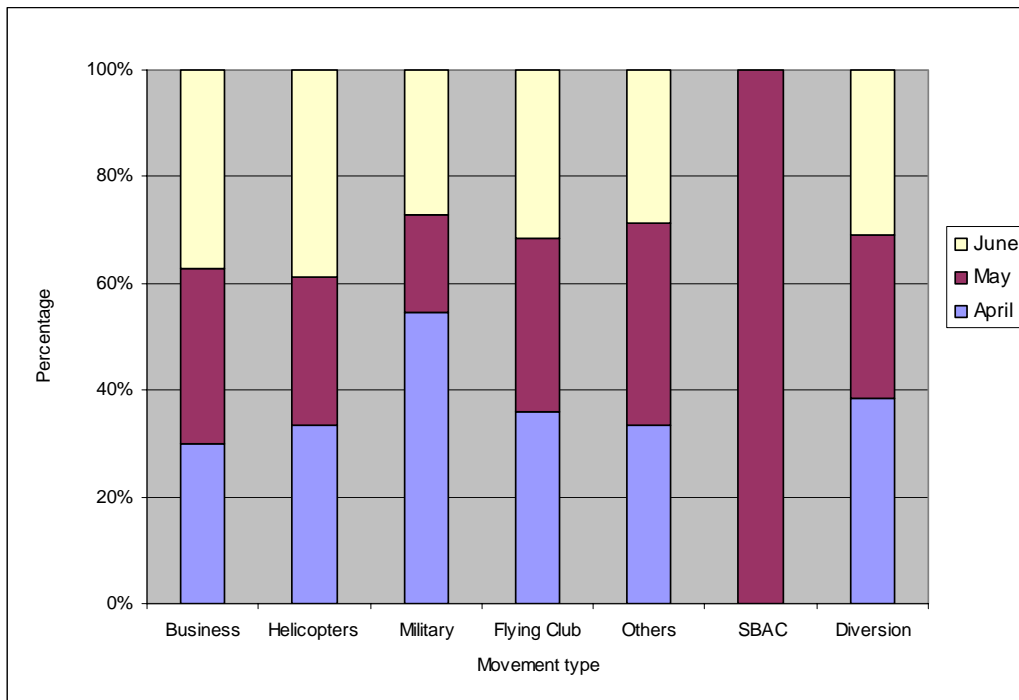
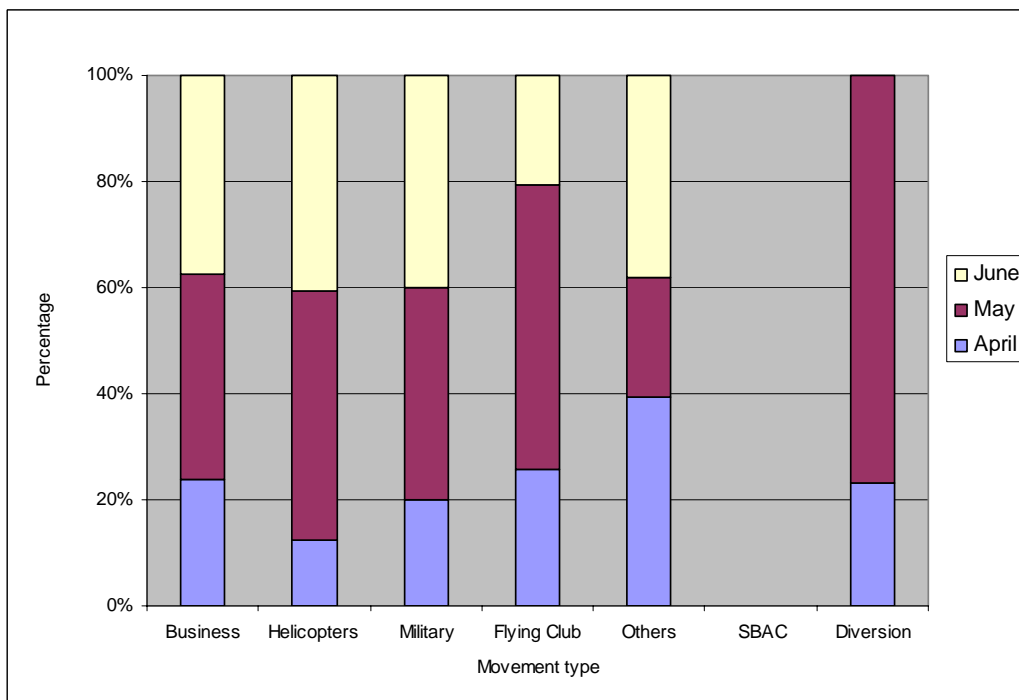


Figure 5: Percentage of Weekend and Bank Holiday Movements by Type, Quarter 2, 2008.



3.2 Figures 6, 7, 8 and 9 display information regarding runway use including operation. Operation refers to whether the movement was a Departure or an Arrival.

Figure 6: Monthly Movements by Runway Used and Operation April 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)

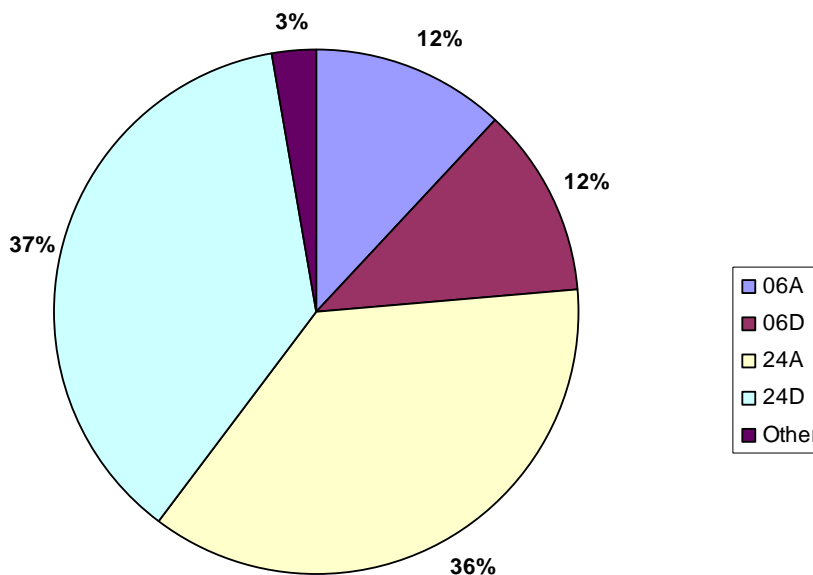
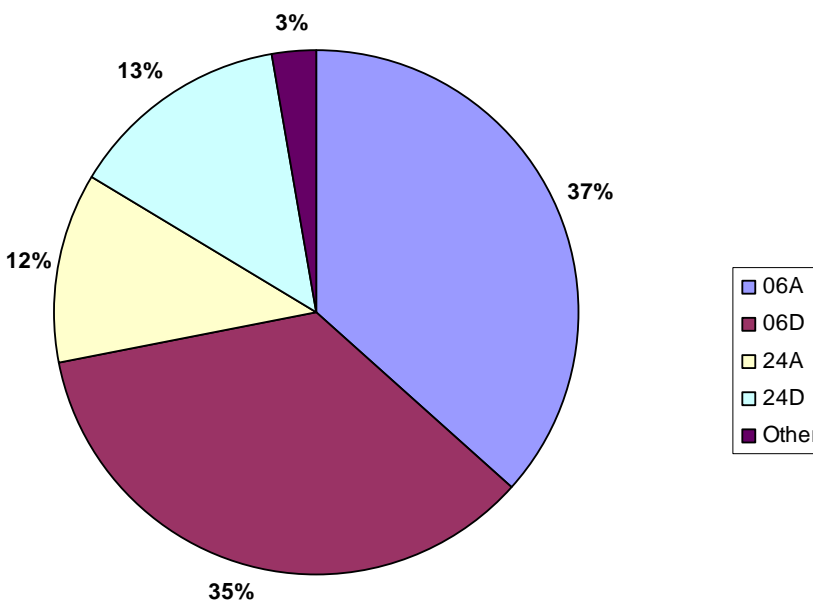


Figure 7: Monthly Movements by Runway Used and Operation May 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)



3.3 The results from May (Figure 7) show that in contrast to standard trends, runway 06 was in use for 72% of aircraft movements. This can be attributed to the easterly and north easterly wind that prevailed for this period and does not reflect any change in airport procedures.

Figure 8: Monthly Movements by Runway Used and Operation June 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)

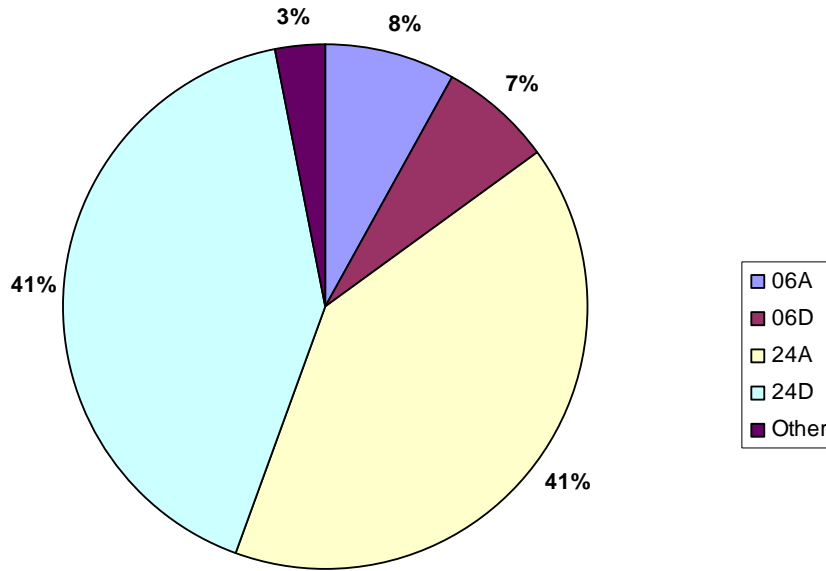
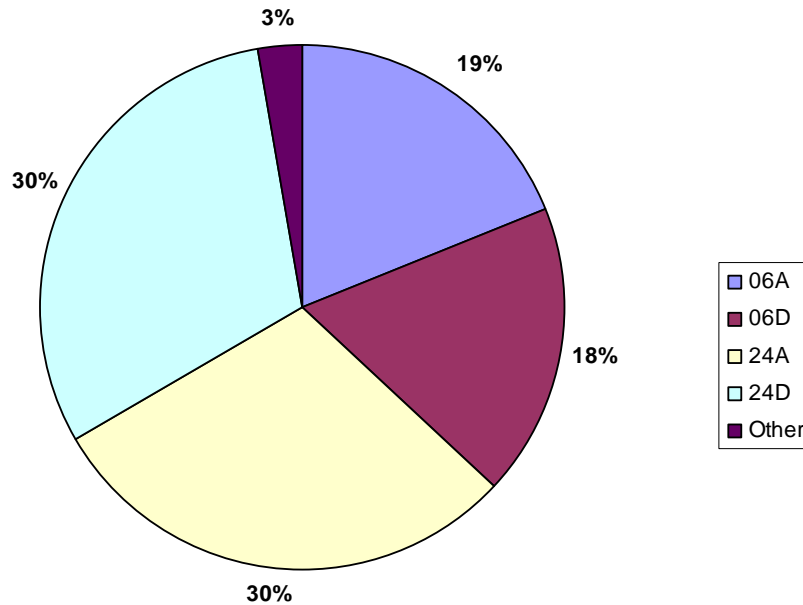
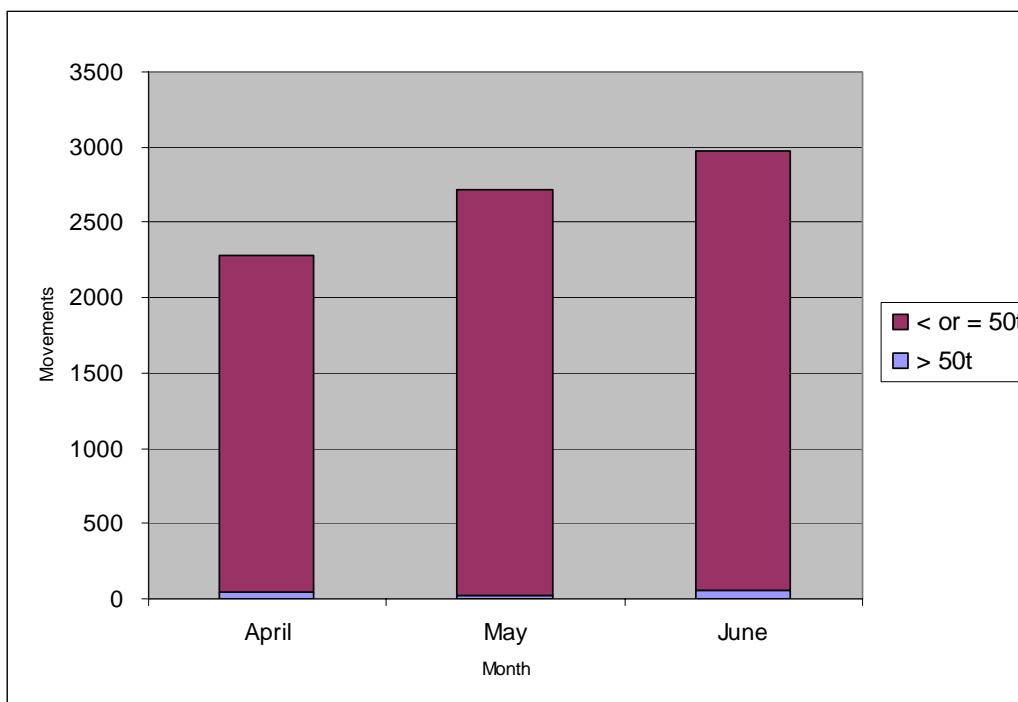


Figure 9: Overall runway usage split for Quarter 2, April – June 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)



The Maximum Take-Off Weight (MTOW) is recorded for all operating aircraft. Figure 10 gives a summary of the MTOW of aircraft operated during each month of the second quarter of 2008.

Figure 10: Number of movements by Maximum Take-Off Weight (MTOW), Quarter 2, 2008



All civil aircraft using Farnborough during the second quarter were compliant with the International Civil Aviation Organisation (ICAO) Chapter 3 classification. Chapter classifications are calculated from aircraft noise measurements made during take-off and landing. The results of monitoring exercises are expressed as a function of aircraft mass and number of engines. All measurements are required to be below the certified noise levels in order to comply with that certification standard. Aircraft not compliant with an ICAO standard may be fitted with “hushkits” (have their original engines adjusted or replaced to comply with the required standard).

A new more stringent ICAO standard, ICAO Chapter 4 has been finalised with all aircraft manufactured from the beginning of 2006 being built to Chapter 4 specifications or above. The new classification requires aircraft noise performance, as measured by manufacturers, to fall by 10dB (A) below that required by Chapter 3.

3.7 Helicopters, light aircraft and military aircraft are not subject to the requirements of the ICAO noise certification scheme.

4. AIR QUALITY MONITORING

- 4.1 The locations of the thirteen nitrogen oxide diffusion tubes remain as previously reported. To see details of the locations of the monitors please refer to previous reports before the first quarter of 2005. Table 3 displays the standards accepted by the Government and recommended by the expert panel on air quality standards.

Table 3: Objectives to be included in regulations for the purposes of local Air Quality Management

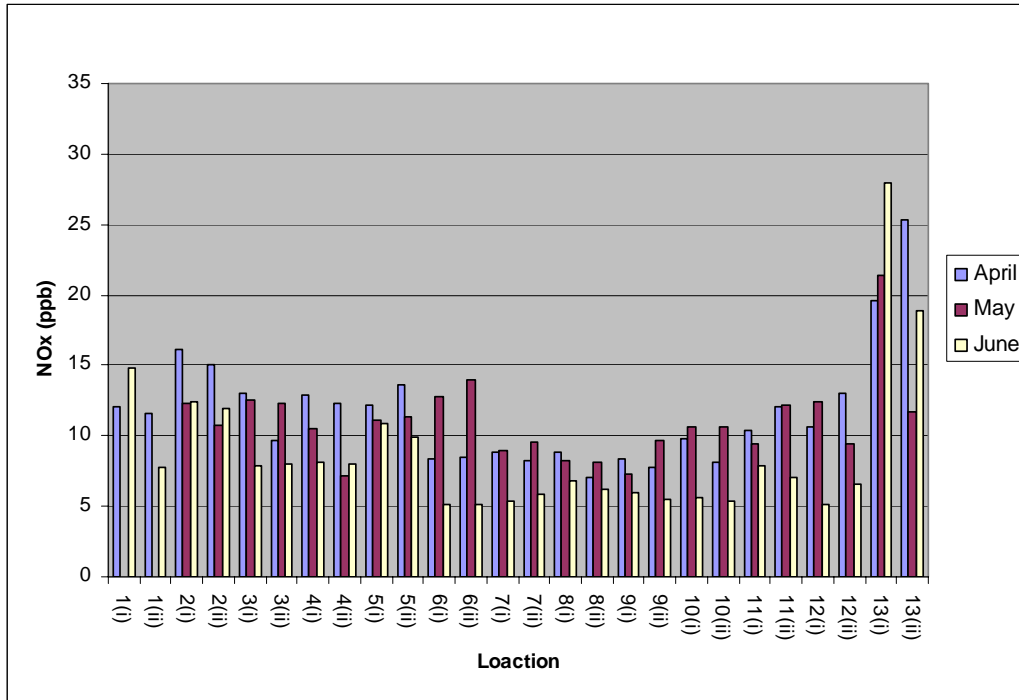
Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen Dioxide	200µg/m ³ (105ppb) not to be exceeded more than 18 times a year	1 hour mean	31 st Dec 2005
Nitrogen Dioxide	40µg/m ³ (21ppb)	annual mean	31 st Dec 2005

^aConversions of ppb and ppm to µg/m³ and mg/m³ at 20°C and 1013mb. ppb = parts per billion; µg/m³ = microgrammes per cubic metre.

Source: *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*. Department for the Environment, Food and Rural Affairs in partnership with the Scottish Executive, The National Assembly for Wales and the Department of the Environment for Northern Ireland, 2000.

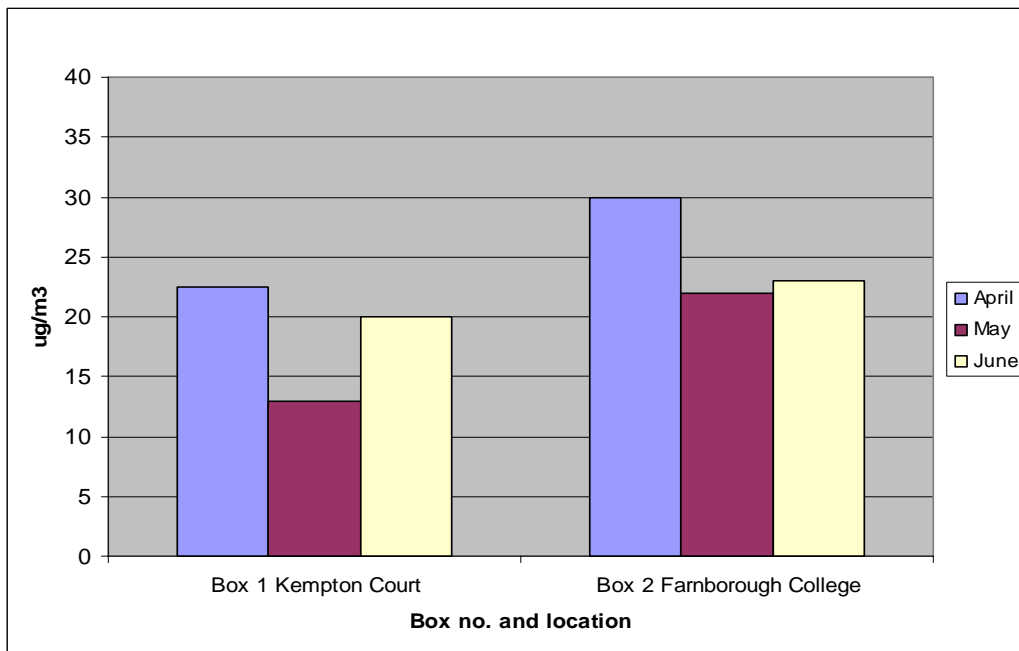
- 4.2 The results of the air quality survey consist of both raw and manipulated data taken from the diffusion tube laboratory analysis. The raw data taken from the Learian Streetbox Monitors consists of hourly mean concentrations of NOx. As this data is extensive when covering a three-month period, it has been displayed as monthly means for the purpose of this report.
- 4.3 The results of both the passive and active NOx monitoring are detailed in Figures 11 and 12.

Figure 11: NOx Diffusion Tube Results Quarter 2, 2008



N.B. ppb - parts per billion expressed as a monthly mean. This data has not had a bias adjustment applied

Figure 12: NOx concentrations as recorded by Learian Streetbox Monitors, Quarter 2, 2008



N.B. ug/m3 expressed as a monthly mean

- 4.4 Nitrogen oxide results taken from the diffusion tubes indicate that NO_x levels around the airfield have, during quarter 2, achieved the objectives to be included in the regulations as set out by the Air Quality Regulations.
- 4.5 Continuing trends in the results obtained appear to indicate terrestrial sources of NO_x as the predominate source. The elevated levels consistently recorded for location 13 adjacent to the M3 motorway illustrate this. Location 13 lies within Rushmoor's Air Quality Management Area (AQMA), declared for nitrogen dioxide. Lowest comparative levels during quarter 2 were recorded at sites 7, 8, 9, 10, 11 and 12, all of which lie within the airfield boundary. The results for site 1 (Kempton Court) in May were recorded as "below the level of detection" hence the reading of zero on Figure 12 for sites 1(i) and 1(ii).

5. CONCLUSION

- 5.1 Routine monitoring of compliance with noise abatement routes, air quality targets, and aircraft movements continues at the airport. To date, all environmental monitoring undertaken has been implemented in accordance with the regulatory requirements and those of the Town and Country Planning Act Section 106 Agreement.
- 5.2 All movements operated at the airport are restricted to those permitted by the terms of the planning consent and the accompanying agreement.
- 5.3 Nitrogen oxide levels recorded by monitoring stations remain consistent with previously noted trends. Nitrogen Dioxide levels are naturally elevated over the colder winter months compared with results obtained during the summer; this is as a result of the release of nitrates from the soils and decomposition processes.
- 5.4 The activities at the airport remain within those required by the Section 106/299A agreement.

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Appendix A.

Monthly Report (Tabular)

From 01/04/2008 to 30/06/2008



**Farnborough
Airport**

04/2008

Leq (Total) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2	80.9	54.9	54.1	56.4	50.9	55.7	53.8	52.9	52.4	54.5	57.6	73.2	53.0	54.6	53.8	52.8	60.0	58.2	73.9	69.5	54.9	55.4	53.6	54.8	55.0	50.4	51.4	54.7	53.4	54.3
3	82.0	56.4	55.4	56.4	53.9	52.0	57.0	54.6	56.0	56.8	59.0	55.2	55.8	57.6	55.3	56.3	56.6	56.8	54.1	53.8	56.6	56.9	56.6	59.5	57.0	53.0	54.9	59.5	56.8	58.5

05/2008

Leq (Total) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	54.5	54.9	54.2	52.0	50.7	53.0	51.5	51.6	52.8	50.5	50.6	51.9	55.0	53.2	52.0	52.5	48.8	50.5	51.7	52.1	52.0	52.6	54.0	60.8	75.1	61.4	51.2	52.1	51.7	53.1	49.7
3	57.4	57.5	53.7	52.9	54.4	56.7	57.0	58.5	56.5	53.3	54.8	57.3	56.8	57.0	56.3	58.6	55.8	54.2	55.6	58.4	59.2	58.0	57.3	55.6	55.4	55.5	57.2	58.4	56.7	56.4	53.5

06/2008

Leq (Total) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2	48.8	52.0	57.3	53.1	56.0	54.2	48.7	49.5	54.1	52.4	52.3	55.1	52.8	49.0	50.0	52.2	53.6	56.3	55.5	56.3	51.1	55.7	53.1	52.5	53.5	54.5	55.4	50.7	50.1	53.1
3	55.3	57.6	58.1	57.4	57.7	57.2	54.2	56.0	56.5	57.1	58.1	58.6	56.0	53.5	53.4	56.6	58.1	59.2	57.7	58.3	53.9	56.5	56.4	57.6	58.0	58.2	58.8	54.8	55.0	58.3

Selection criteria: TRUE AND (F2.START_DATE BETWEEN #2008/04/01# AND #2008/06/30#) and F2.NMT_NUMBER in (2 , 3)

Monthly Report (Tabular)

From 01/04/2008 to 30/06/2008



**Farnborough
Airport**

04/2008

Leq (Event) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2	79.8	53.1	51.4	53.8	46.9	46.9	51.2	48.5	49.5	52.5	52.4	70.5	46.0	51.1	46.9	48.2	56.9	52.7	71.7	65.2	52.0	52.8	50.4	51.0	49.7	41.6	46.1	51.4	48.6	49.6
3	81.9	54.1	52.9	53.8	51.0	48.4	54.6	51.3	52.6	54.5	57.1	51.6	53.4	55.5	51.9	53.7	53.3	53.5	50.0	50.5	53.9	54.9	53.5	57.7	54.8	47.7	51.4	57.9	53.1	56.1

05/2008

Leq (Event) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	49.9	51.7	43.8	44.9	47.1	49.2	48.1	47.3	50.7	47.9	46.3	48.8	52.5	49.2	49.7	50.6	44.4	45.5	49.2	49.5	48.9	50.0	51.7	55.0	71.5	58.7	48.7	47.0	49.3	51.6	47.1
3	54.4	55.1	48.3	45.7	48.6	53.5	54.8	56.5	53.6	47.5	52.9	55.4	54.6	55.1	54.1	57.4	48.7	52.1	53.0	57.2	57.4	56.2	55.8	52.9	53.1	50.3	55.9	56.7	55.0	54.7	48.5

06/2008

Leq (Event) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2	45.2	49.8	51.2	49.0	53.5	52.1	45.0	45.6	52.9	50.7	49.9	53.9	50.3	44.1	46.4	50.2	50.8	51.4	51.3	50.7	48.0	47.0	51.3	49.7	48.4	49.1	51.9	46.4	45.4	50.0
3	53.1	56.0	55.2	54.8	55.6	54.4	50.2	54.2	53.6	54.9	55.8	56.7	53.1	49.2	50.6	54.6	56.0	57.1	55.4	56.8	50.6	53.5	54.4	55.9	56.3	56.6	57.3	52.8	53.2	57.2

Selection criteria: TRUE AND (F2.START_DATE BETWEEN #2008/04/01# AND #2008/06/30#) and F2.NMT_NUMBER in (2 , 3)

Monthly Report (Tabular)

From 01/04/2008 to 30/06/2008



**Farnborough
Airport**

04/2008

Leq (Background) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2	76.9	50.1	50.8	53.0	48.8	55.2	50.5	50.9	49.2	50.2	56.1	70.6	52.1	52.0	52.8	51.1	57.5	56.9	71.5	68.4	52.0	51.8	50.7	52.5	53.5	49.8	49.8	52.0	51.7	52.6
3	67.0	52.6	51.9	52.9	50.8	49.5	53.2	52.0	53.2	53.0	54.6	52.7	52.1	53.5	52.6	52.8	54.0	54.1	52.0	51.1	53.2	52.7	53.7	54.7	53.1	51.4	52.3	54.6	54.4	54.9

05/2008

Leq (Background) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	52.7	52.2	53.8	51.1	48.3	50.8	49.0	49.6	48.6	47.1	48.7	48.9	51.3	51.0	48.1	48.0	46.9	48.9	48.2	48.7	49.1	49.2	50.2	59.9	73.2	58.5	47.7	50.5	48.0	47.8	46.3
3	54.5	53.8	52.3	52.0	53.0	53.9	53.1	54.2	53.3	52.0	50.3	52.8	52.8	52.5	52.4	52.4	54.9	50.0	52.2	52.5	54.6	53.3	52.0	52.3	51.5	53.9	51.3	53.3	51.8	51.5	52.0

06/2008

Leq (Background) by Day of Month (by NMT)

NMT / DAY

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2	46.3	48.0	56.2	51.0	52.5	50.0	46.3	47.3	48.1	47.7	48.5	49.1	49.3	47.3	47.4	48.0	50.3	54.7	53.4	55.1	48.2	55.1	48.4	49.4	51.9	53.0	52.9	48.8	48.3	50.3
3	51.4	52.4	54.9	54.0	53.5	53.9	52.0	51.1	53.5	53.0	54.2	54.3	52.9	51.4	50.2	52.4	53.8	55.1	53.8	52.9	51.1	53.5	52.2	52.8	53.2	53.2	53.5	50.4	50.5	52.1

Selection criteria: TRUE AND (F2.START_DATE BETWEEN #2008/04/01# AND #2008/06/30#) and F2.NMT_NUMBER in (2 , 3)