



Aviation

Farnborough Airport Ltd

Town and Country Planning Act Section 106/299A

**Environment Report Quarter 1
January – March 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 first quarter of 2008, (January to March 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 overleaf display L_{eq} data for correlated aircraft Events (Event), Total L_{eq} levels (Total) and Background noise (Background), calculated as comparable A-weighted (DbA) values, by day of month and NMT for January, February and March respectively.

Figure 1: Noise as L_{eq} Total, Event and Background, by Day of Month and NMT for January 2008.

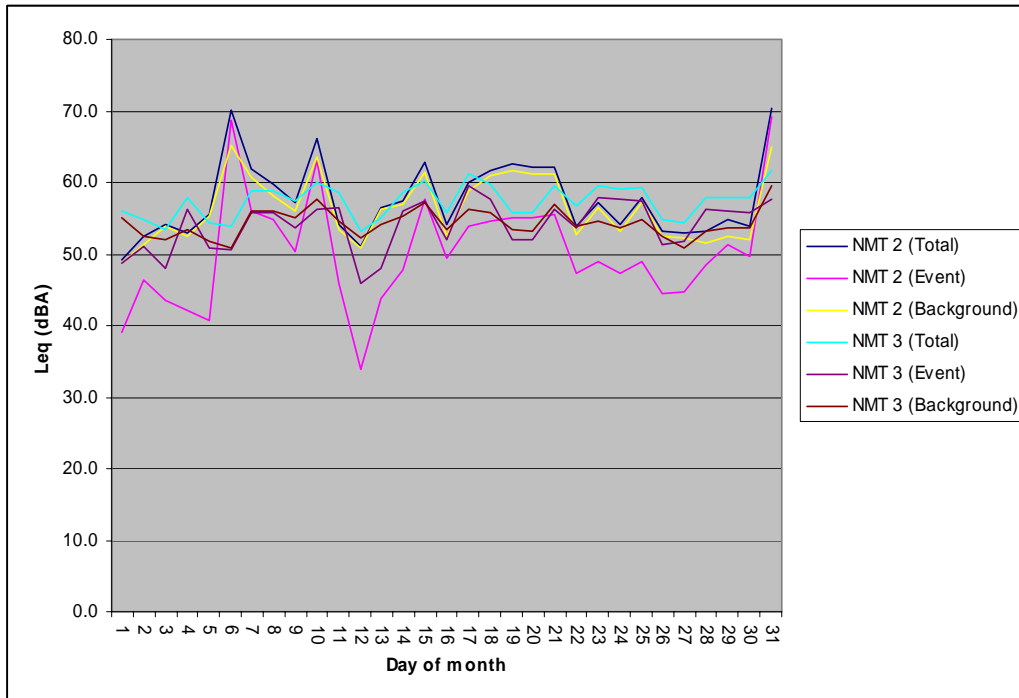
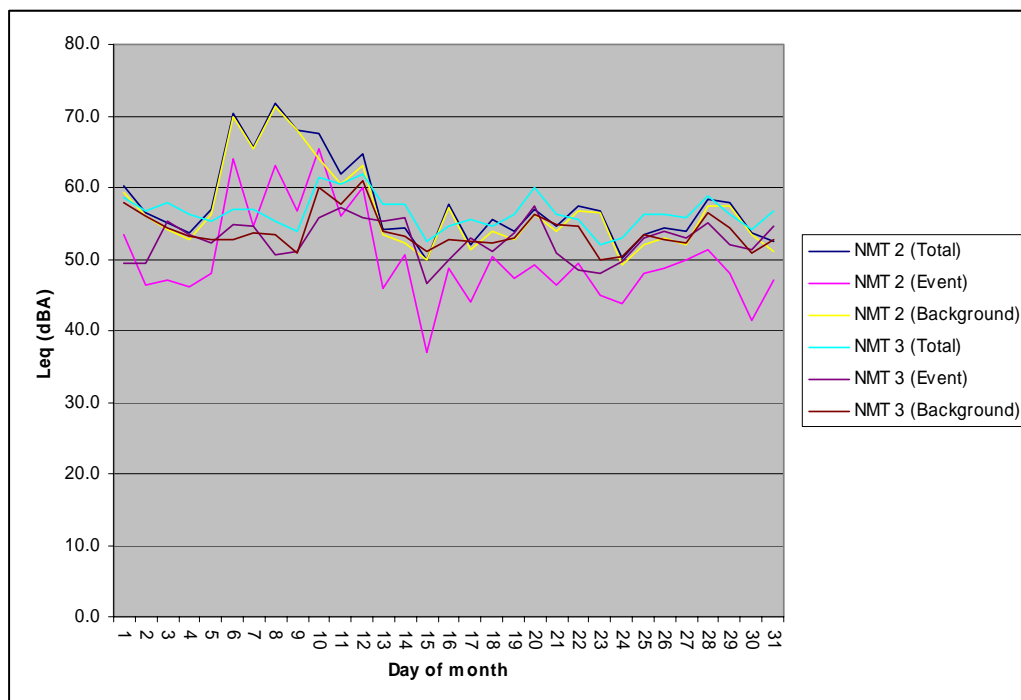


Figure 2: Noise as L_{eq} Total, Event and Background by day of month and NMT for February 2008.



Figure 3: Noise as L_{eq} Total, Event and Background by day of month and NMT for March 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.

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 not required to be declared as part of the Planning Permission agreement

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

**N.B. The figure of 30,000 movements is derived from the permitted declared total of 28,000 with an additional 2,000 movements that relate to flights that are not required to be declared as a part of the Planning Permission Agreement, i.e. military, flying club, diversions etc.

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) and is currently being investigated.
- 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.
- 2.10 Daily L_{eq} Figures are given in Appendix A.

3. AIRCRAFT MOVEMENTS

- 3.1 Table 2 shows aircraft movements for the Q1 period 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	January	February	March	Quarter 1, 2008	Total 2008
Business	1890	1857	1928	5675	5675
Helicopter	86	98	81	265	265
Subtotal (Planning Agreement Movements)	1976	1955	2009	5940	5940
Flying club	38	70	27	135	135
Military	16	10	5	31	31
Diversion	10	10	6	26	26
Other	69	66	121	256	256
SBAC	0	0	0	0	0
Total	2109	2111	2168	6388	6388

Figure 4: Weekday Movements by Type for quarter 1, January –March 2008

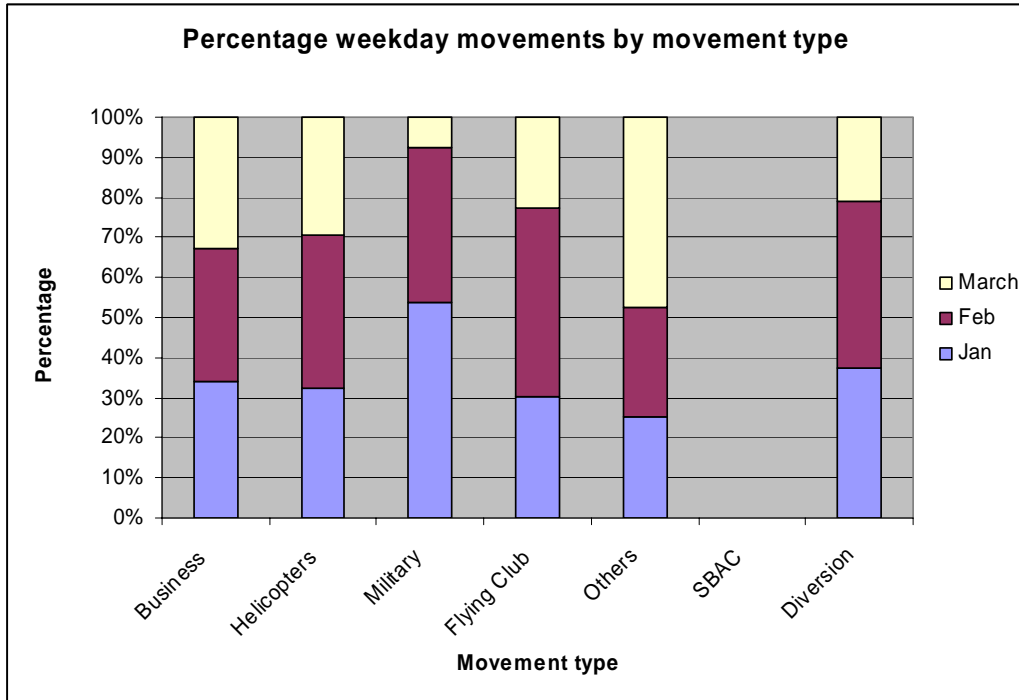
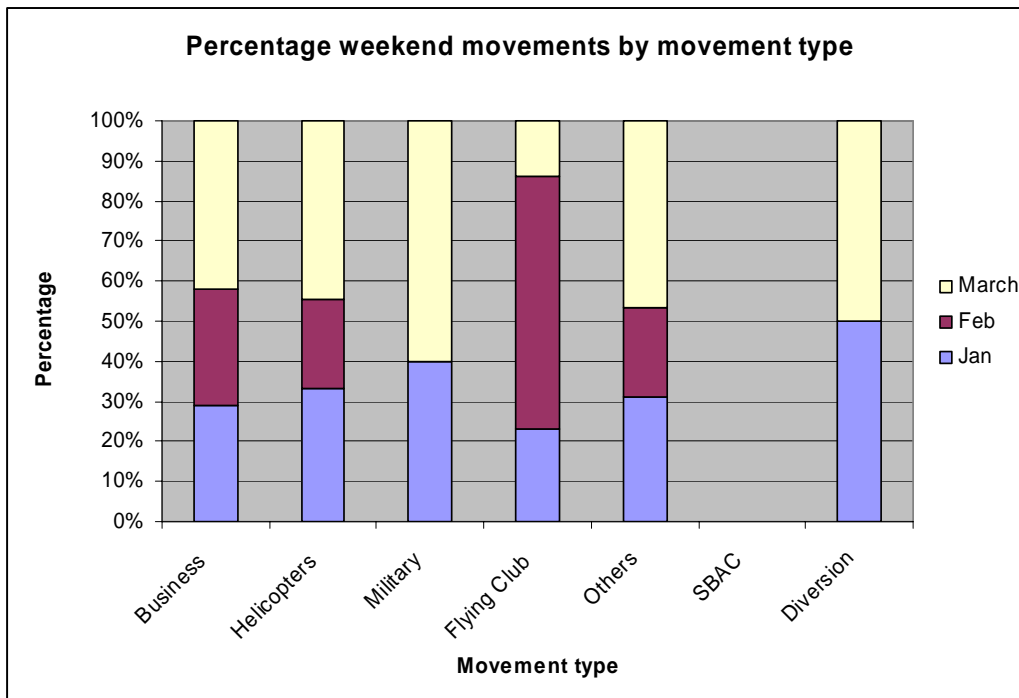


Figure 5: Weekend and Bank Holiday Movements by Type for quarter 1, January – March 2008.



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 January 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)

Movements by runway used and operation, January 2008

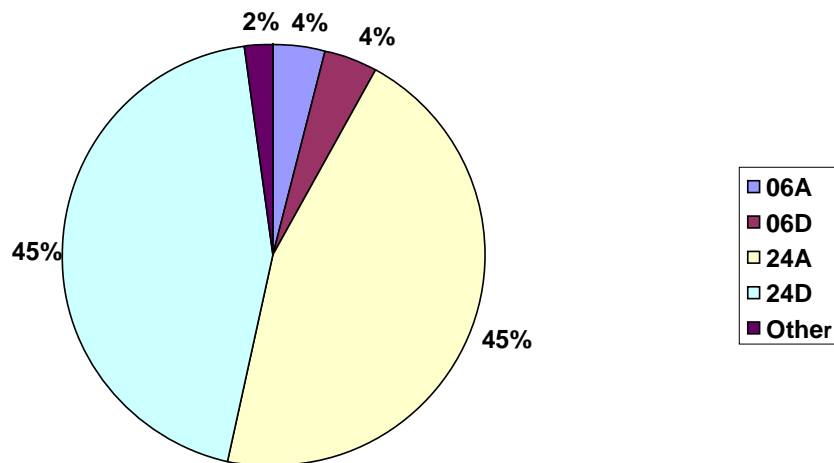


Figure 7: Monthly Movements by Runway Used and Operation February 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)

Movements by runway and operation, February 2008

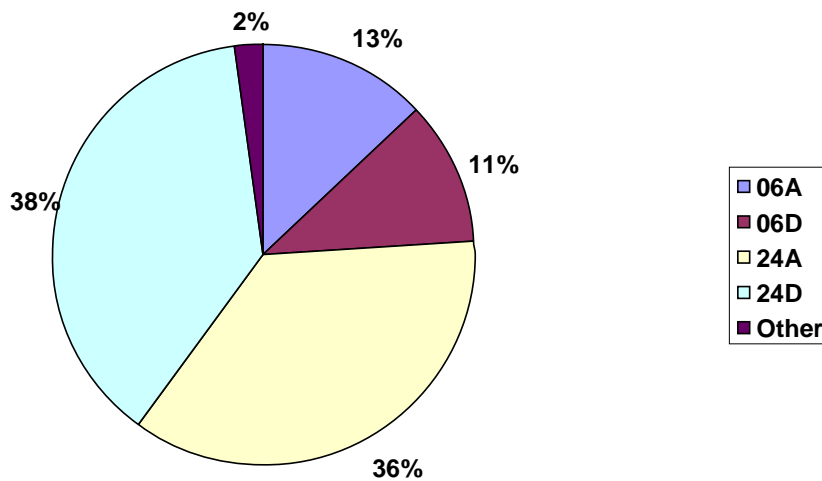


Figure 8: Monthly Movements by Runway Used and Operation March 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)

Movements by runway used and operation, March 2008

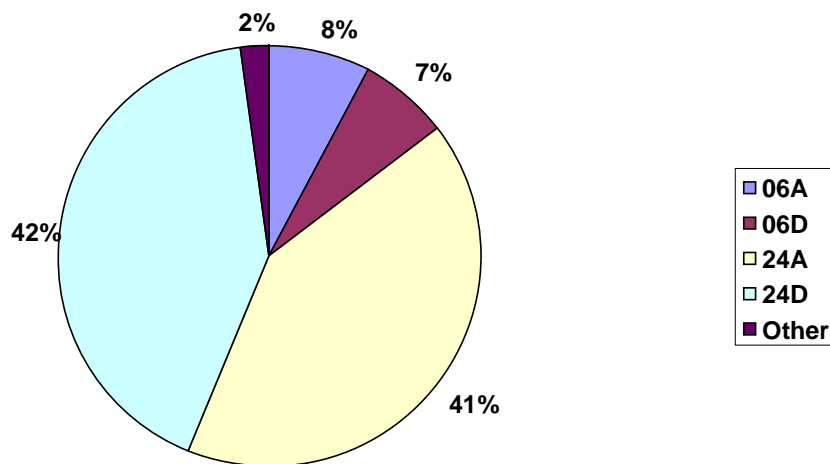
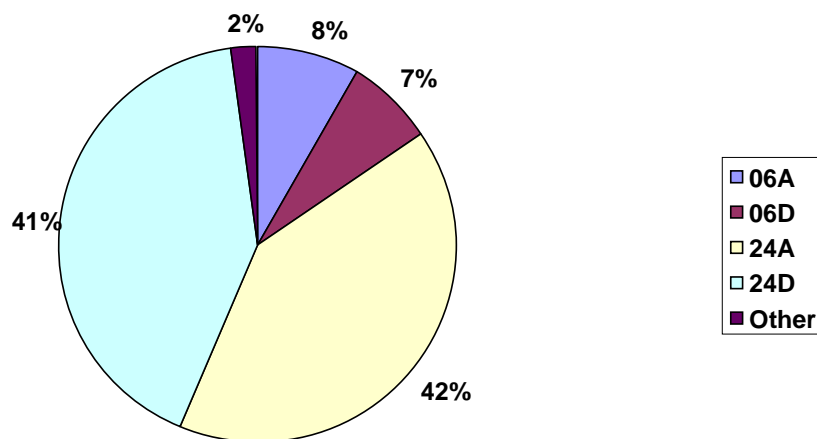


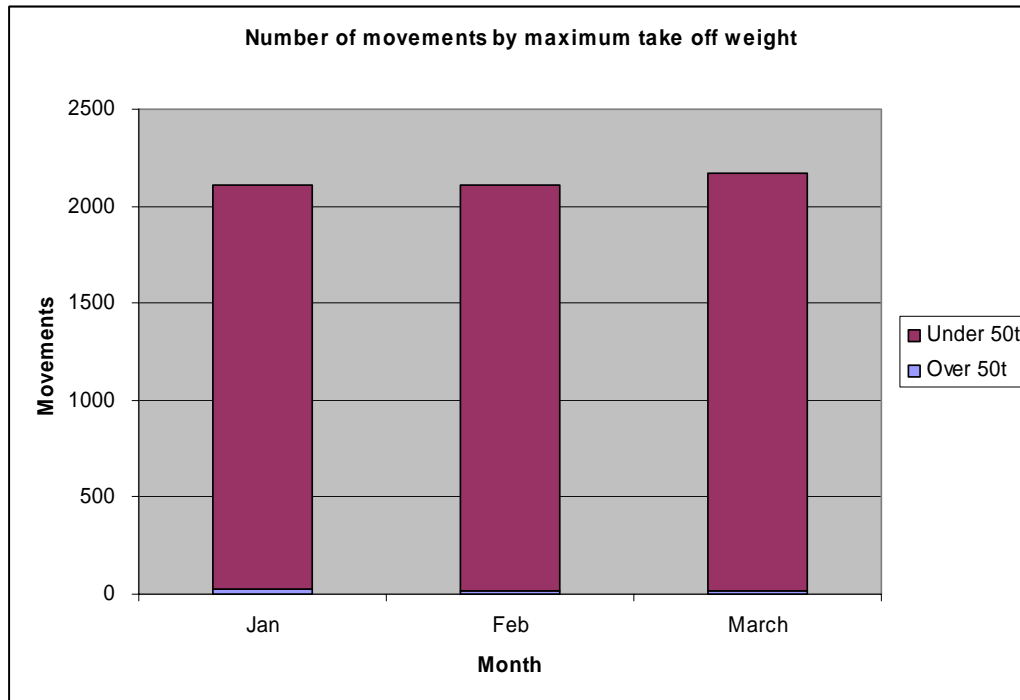
Figure 9: Overall runway usage split for Quarter 1, January – March 2008
 Key: A-Arrival, D-Departure, Other- Non runway traffic (helicopters)

Movements by runway type and operation for Quarter 1, Jan-March 2008



3.3 The Maximum Take-Off Weight (MTOW) is recorded by the NTMS for all fixed wing aircraft. Figure 10 gives a summary of aircraft MTOW for the first quarter 2008.

Figure 10: Movements by Maximum Take Off Weight (MTOW) Quarter 1, January- March 2008.



3.4 All civil aircraft using Farnborough during the first 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).

3.5 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.

3.6 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

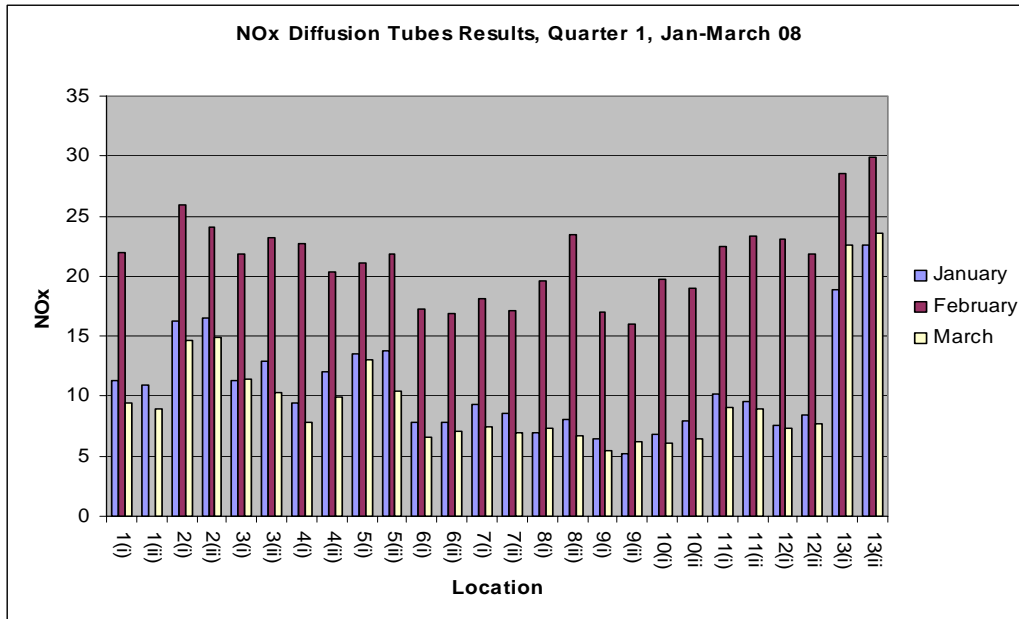
Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen Dioxide	200 $\mu\text{g}/\text{m}^3$ (105ppb) not to be exceeded more than 18 times a year	1 hour mean	31 st Dec 2005
Nitrogen Dioxide	40 $\mu\text{g}/\text{m}^3$ (21ppb)	annual mean	31 st Dec 2005

^aConversions of ppb and ppm to $\mu\text{g}/\text{m}^3$ and mg/m^3 at 20°C and 1013mb. ppb = parts per billion; $\mu\text{g}/\text{m}^3$ = 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.

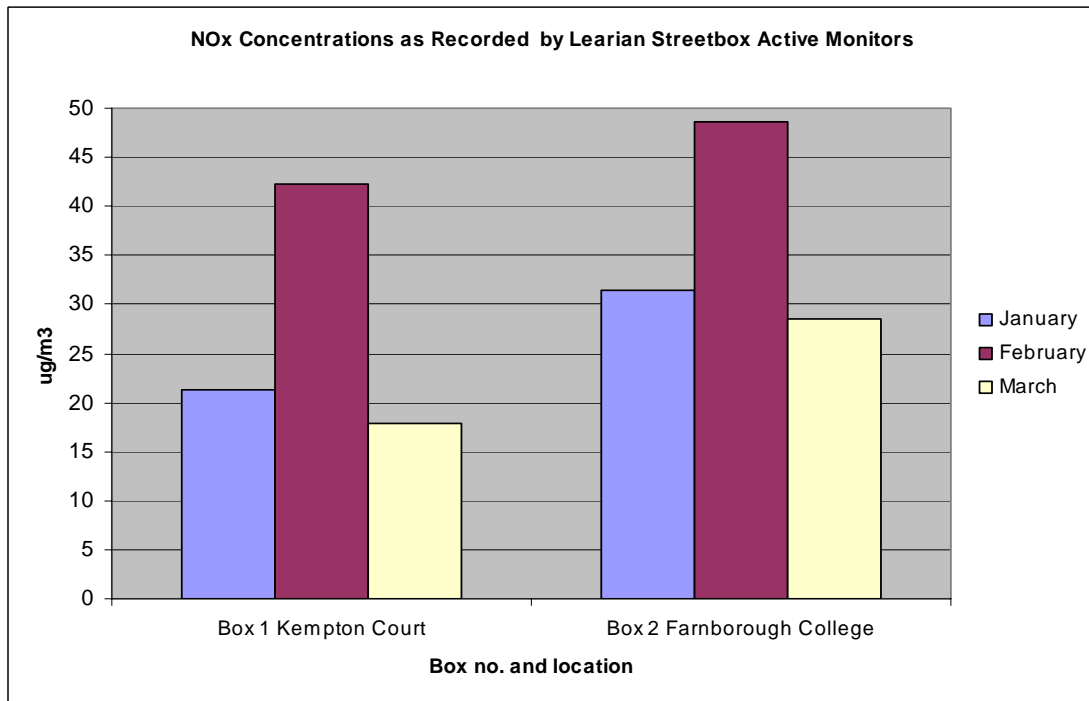
- 4.2 The results of the air quality survey consist of both raw and manipulated data taken from the diffusion tube laboratory analysis. The raw data taken from the Learian Streetbox Monitors consists of hourly mean concentrations of NOx. As this data is extensive when covering a three month period, it 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: Nitrogen Oxides Diffusion Tube Results Quarter 1, January –March 2008



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

Figure 12: Nitrogen Oxides Learian Streetbox Results Quarter 1, January – March 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, on average during quarter 1, achieved the objectives to be included in the regulations, as set out by the Air Quality Regulations. Whilst levels recorded by the monitoring network continued to remain well below the accepted levels stated in Table 4 in January and March, a large increase in NO_x levels is apparent in February. This increase is validated by the corresponding increase in result data taken from the active monitoring sites. As the combination of results show these increased NO_x levels were not confined to the areas around the Airport and were in fact seen at all 13 locations including the monitoring station at Church Crookham (Bank 6) which is up wind from the airfield.

Furthermore, aircraft activity during February 2008 was only 9.5% greater than February 2007 and statistically was the least busy month of quarter 1 2008. As aircraft operations did not significantly differ from "normal" and the increased levels of NO_x was recorded across the entire area it can be concluded that airport operations was not a contributing factor. Results from March show that NO_x levels resumed to more typical values for the time of year and further support the conclusion that February's results were anomalous.

Continuing trends in the results obtained appear to indicate terrestrial sources of NO_x as the predominate source. This is illustrated by the elevated levels consistently recorded for location 13 adjacent to the M3 motorway. Location 13 lies within Rushmoor's Air Quality Management Area (AQMA), declared for nitrogen dioxide. Lowest comparative levels during Quarter 1 were recorded at locations 7, 8, 9, 10, 11 and 12, all of which lie within the airfield boundary.

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 (with the exception of February – see 4.4). 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 01/01/2008 to 31/03/2008



01/2008

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	49.1	52.5	54.2	52.9	55.5	70.1	61.8	59.8	57.1	66.2	54.2	51.0	56.4	57.5	62.8	54.2	60.1	61.7	62.5	62.1	62.1	53.8	57.2	54.1	57.8	53.1	53.0	53.2	54.9	53.9	70.3
3	56.0	54.8	53.5	58.0	54.3	53.8	58.9	58.8	57.4	60.1	58.7	53.2	55.1	58.6	60.3	55.7	61.2	59.7	55.8	55.7	59.6	56.8	59.6	59.0	59.3	54.8	54.3	58.0	58.0	57.9	61.7

02/2008

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
2	55.5	51.7	54.3	57.4	64.7	57.9	54.3	53.5	54.8	74.8	52.5	52.2	53.6	52.7	54.2	49.0	49.2	53.4	51.5	52.6	56.6	58.5	50.9	49.8	57.2	62.2	54.4	53.5	65.7
3	58.3	53.1	54.4	58.5	59.7	56.2	57.9	58.7	55.5	51.7	56.7	55.2	57.7	56.6	57.4	53.5	53.8	56.9	55.9	55.9	58.1	58.3	53.0	53.4	57.5	58.7	56.8	54.0	59.9

03/2008

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	60.3	56.4	55.0	53.6	56.9	70.4	65.7	71.7	68.1	67.5	61.8	64.7	54.1	54.4	50.0	57.6	52.0	55.6	53.8	57.0	54.5	57.3	56.7	50.2	53.4	54.3	54.0	58.4	57.9	53.7	52.5
3	58.5	56.8	57.8	56.3	55.4	57.0	57.0	55.2	53.9	61.3	60.4	62.0	57.7	57.6	52.4	54.6	55.6	54.7	56.3	59.9	56.3	55.6	52.0	53.0	56.2	56.2	55.7	58.8	56.3	54.2	56.8

Selection criteria: TRUE AND (F2.START_DATE BETWEEN #2008/01/01# AND #2008/03/31#) and F2.NMT_NUMBER in (2 , 3)

Monthly Report (Tabular)

From 01/01/2008 to 31/03/2008



01/2008

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	39.0	46.3	43.6	42.2	40.7	68.8	55.9	54.9	50.4	63.1	45.9	33.9	43.8	47.7	57.7	49.5	53.9	54.7	55.0	55.1	55.6	47.4	49.0	47.3	49.0	44.5	44.6	48.4	51.4	49.6	69.2
3	48.8	51.1	48.0	56.2	50.8	50.6	55.8	55.7	53.7	56.3	56.5	45.8	48.1	56.0	57.4	52.0	59.6	57.6	51.9	52.1	56.2	53.7	58.0	57.6	57.4	51.2	51.7	56.3	56.1	55.8	57.7

02/2008

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
2	50.1	38.1	45.5	52.8	60.0	54.7	49.5	42.7	41.9	74.0	45.7	45.3	48.0	44.1	45.2	30.4	39.2	43.9	43.2	48.6	49.0	50.8	22.7	42.2	51.1	58.5	51.1	50.6	62.3
3	56.0	47.7	50.0	55.9	57.1	52.0	55.9	56.7	46.3	45.3	52.8	49.6	54.8	54.6	55.3	50.1	51.0	53.6	53.8	54.1	56.1	56.0	48.9	50.2	54.6	55.1	54.4	49.6	56.6

03/2008

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	53.5	46.3	47.0	46.1	48.1	63.9	54.6	63.0	56.6	65.3	55.9	59.9	46.0	50.6	37.0	48.6	44.0	50.4	47.2	49.1	46.3	49.4	45.0	43.8	48.0	48.8	50.0	51.4	48.1	41.3	47.0
3	49.5	49.4	55.2	53.4	52.2	54.9	54.5	50.5	51.0	55.8	57.2	55.8	55.3	55.7	46.7	50.0	52.9	51.0	53.6	57.5	50.9	48.5	48.1	49.7	53.0	53.8	53.0	55.0	52.0	51.4	54.7



Selection criteria: TRUE AND (F2.START_DATE BETWEEN #2008/01/01# AND #2008/03/31#) and F2.NMT_NUMBER in (2 , 3)

Monthly Report (Tabular)

From 01/01/2008 to 31/03/2008



01/2008

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	48.7	51.3	53.8	52.5	55.3	65.2	60.6	58.2	56.0	63.5	53.5	50.9	56.2	57.0	61.3	52.4	58.9	60.9	61.6	61.2	61.1	52.7	56.5	53.1	57.2	52.5	52.3	51.5	52.5	52.0	64.9
3	55.1	52.4	52.1	53.5	51.8	50.9	56.1	55.9	55.0	57.7	54.6	52.3	54.2	55.2	57.1	53.4	56.2	55.8	53.5	53.2	57.0	53.9	54.5	53.6	54.9	52.4	50.9	53.1	53.6	53.7	59.6

02/2008

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
2	54.0	51.5	53.6	55.6	63.0	55.0	52.6	53.2	54.6	68.8	51.5	51.2	52.2	52.0	53.7	49.0	48.7	52.8	50.8	50.4	55.7	57.8	50.9	49.0	56.0	59.9	51.7	50.5	63.3
3	54.5	51.6	52.5	55.1	56.2	54.1	53.6	54.4	55.0	50.6	54.4	53.8	54.5	52.4	53.3	50.9	50.5	54.1	51.7	51.2	53.9	54.4	50.9	50.5	54.3	56.2	53.1	52.1	57.1

03/2008

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	59.3	56.0	54.2	52.8	56.2	69.9	65.5	71.3	67.9	63.9	60.5	63.0	53.3	52.2	49.8	57.1	51.3	54.0	52.8	56.3	53.8	56.6	56.4	49.1	51.9	52.9	51.9	57.4	57.5	53.5	51.1
3	58.0	55.9	54.3	53.2	52.6	52.8	53.6	53.4	50.8	59.9	57.6	60.9	53.8	53.1	51.1	52.7	52.4	52.3	53.0	56.2	54.9	54.7	49.8	50.3	53.4	52.6	52.3	56.5	54.3	50.9	52.8

Selection criteria: TRUE AND (F2.START_DATE BETWEEN #2008/01/01# AND #2008/03/31#) and F2.NMT_NUMBER in (2 , 3)