DUNSFOLD AERODROME
LONDON 2012 OLYMPIC GAMES
PLANNING APPLICATIONS: WA/2011/2047 AND 2048
AMENDMENT OF CONDITIONS 7, 8 and 11
FOR PERIOD 21st JULY TO 15th AUGUST
AIRCRAFT NOISE

(A9483-R01)

13 February 2012

Report to:

Dunsfold Park Limited
Dunsfold Aerodrome
Cranleigh
Surrey
GU6 8TB

CONTENTS **Page Nos.**

Figures:

Appendices:

1. INTRODUCTION

1.1 The Brief

1.1.1 BAP were retained by Dunsfold Park Limited (DPL) to advise on the aircraft noise implications of the proposed amendment of existing planning conditions for the period 21st July to 15th August 2012 in connection with the London 2012 Olympic Games ("the proposed temporary amendments"). NATS has advised that this period corresponds to the period of anticipated peak demand for air services for the Olympics, and Dunsfold Aerodrome has been included in the list of airports slot allocated by the Secretary of State for Transport.

1.1.2 BAP have visited the Aerodrome, discussed current noise monitoring with the other noise consultants retained by DPL and carried out a desk-top study.

1.1.3 This report provides an appraisal of aircraft noise effects consequent upon the proposed temporary amendments. The appraisal assumes that the maximum slot capacity will be used during the Olympic period, and that this figure will include existing Dunsfold Aerodrome aviation traffic. This is a worst case assumption from a noise perspective.

1.1.4 A glossary of acoustic terms can be found in Appendix 1.

1.2 Dunsfold Aerodrome (with respect to Noise)

1.2.1 The Aerodrome has an 1880m long 45m wide main runway orientated approximately east-west and designated as runway 07/25. It is set 172ft (52m) above mean sea level. There are two other concrete runways, plus a grass runway, but which in comparison have significantly less usage for air traffic movements and which can be discounted for the purposes of this appraisal.

1.2.2 The base of the London TMA overhead is 2500ft, and the London Gatwick control zone is only 1 nautical mile east of the Aerodrome. Navigation of aircraft at Dunsfold Aerodrome is subject to these constraints.

1.2.3 The Aerodrome is the Surrey and Sussex base for the Kent, Surrey & Sussex Air Ambulance Trust service, and it is used also for general aviation and military training. The Air Ambulance helicopter service can operate on all days, night and day, without restrictions, by reason of planning permission WA/2010/0994.

1.2.4 Figure 1 is the Ordnance Survey map for the area of the Aerodrome. A number of villages and isolated residential buildings exist in the area.

1.2.5 Dunsfold Aerodrome is about 3 km west of the large village of Cranleigh. It is 15km or more from the towns of Godalming, Guildford and Horsham. The villages of Alfold and Dunsfold are a short distance away to the south and west, respectively.

1.2.6 Larger aircraft usually land along the extended centre line of an aerodrome's main runway. Smaller aircraft normally land using an arc approach, which, in the case of Dunsfold Aerodrome, is to the south of the extended centre line avoiding the London Gatwick control zone. It is only aircraft with prior permission from London Gatwick air traffic control to fly within the London Gatwick control zone which would overfly Cranleigh. The assumption that aircraft would fly on the extended centre line is also a worst case scenario.

1.2.7 As can be seen from Figure 1, to the east of Dunsfold Aerodrome the only residential settlement is Cranleigh at approximately 3.5km from the threshold of runway 27. The majority of Cranleigh is to the north of the extended centre line.

1.2.8 As can also be seen from Figure 1, there are no villages to the west of Dunsfold Aerodrome on the extended centre line. There are a number of isolated properties and small groups of properties in the vicinity of Alfold Road, Chiddingfold Road and Wrotham Hill at approximately 0.5km to 2km from the threshold of runway 07.

1.2.9 Due to the prevailing wind direction, and based on the 20 year average runway utilization at London Gatwick (which has a runway designation of 08/26), 72% of arrivals at Dunsfold Aerodrome are and will continue to be from the east.

1.2.10 72% of departures from Dunsfold Aerodrome are and will continue to be to the west. Departures may be on the extended centre line, or in an arc to the south for onward navigation towards the MID (Midhurst) VOR VHF omni-directional radio beacon and so as to avoid the Frimley danger area and London TMA to the north. Farnborough LARS/radar and London control direct flights to Europe southwards towards Southampton via MID. Dunsfold village is rarely overflown by departing (or arriving) aircraft.

1.2.11 Departures to the east will seek to avoid penetrating the London Gatwick control zone, and therefore avoid overflying Cranleigh. Overflying of Cranleigh is rare because any such overflyer would go straight towards London Gatwick.

1.2.12 The average ambient noise level at the Aerodrome is generally about 50 dB $L_{Aeq,16h}$ around the Aerodrome perimeter, although very slightly less at weekends. This average ambient noise level includes noise from existing air traffic movements, motor vehicle traffic and other activities in the area.

1.2.13 The Air Ambulance service undertakes approximately 14 air traffic movements per day. A small general aviation facility (Aces High) generates additional air traffic movements. Further air traffic movements (both fixed wing and rotary) are generated by others, including by military and external agency personnel engaged in training and exercises often at low levels.

1.2.14 Other activities at Dunsfold Aerodrome contributing towards the noise level include usage of the runways for car trials, filming, motor cycle and other training and Police training. These uses are intermittent and take place during a limited proportion of the year.

1.2.15 It is relevant to note that the noise levels set by Waverley Borough Council for Top Gear car trials activities are:

65 dB $L_{Aeq, 15mins}$

and 80 dB $L_{A1, 1hour}$

These activities (restricted to 75 days per year, although in fact occurring on around 40 days per year) are monitored at six permanently monitored locations, shown on Figure 2.

1.3 The Temporary Permissions Sought: Applications WA/2011/2047 and 2048

1.3.1 The details and rationale of the short term changes to planning conditions 7, 8 and 11 are set out in the letters of Gerald Eve LLP to Waverley Borough Council, and in the detailed technical report of York Aviation ("Additional Flights for London 2012 Need and Economic Impact").

1.3.2 The noise assessment of the proposals can be carried out (in accordance with policy) on an annual basis or on a 92-day Summer period (mid-June to mid-September) basis. Using worst case assumptions, and adopting the annual basis, an increase from the deemed maximum of 5,000 air traffic movements a year to a maximum of 6,560 air traffic movements per year would generate an insignificant annual increase in noise averaged over the year of just over 1 decibel.

1.3.3 Using worst case assumptions, and adopting the 92-day Summer period basis, an even spread of air traffic movements throughout the year gives rise to 2,820 air traffic movements (including Olympics-related air traffic movements) from mid-June to mid-September. On this approach, there will be a just perceptible increase in noise of just over 3 decibels.

1.3.4 In terms of daily movements, with a constant air traffic distribution in the Olympics period, the deemed current maximum of 16 air traffic movements per day would increase to a maximum of 76 air traffic movements on weekdays and 74 air traffic movements on weekend days. Assuming similar aircraft types, and on worst case assumptions, this would result in a noticeable but still less than moderate increase in daily noise of 7 decibels.

1.3.5 The York Aviation assessment that air traffic movements during the Olympics period will not reach the maximum declared capacity means that the increase in noise level will be even lower than the results set out in paragraphs 1.3.2 to 1.3.4. Furthermore, variations in daily demand and the effects of inclement weather (both of which are bound to occur) will mean that the increase in noise level will be reduced still further.

1.3.6 The noise impacts of Olympics air traffic movements will be due to business aviation turbo fan aircraft. As the Inspectors concluded in the report into the recent proposal for increased air traffic movements at Farnborough Airport (planning permission granted by the Secretaries of State in February 2011), modern business jets are not very noisy and their noise builds and recedes quite quickly (usually in less than 30 seconds) without being unduly intrusive. Figure 3 illustrates past and current Dunsfold Aerodrome aircraft and their relative noise characteristics.

1.3.7 The applications seek only an additional 60 minutes operating time each weekday, which is to say only 30 extra minutes at the beginning and end of the day, with the same operating hours at weekends. There will be no air traffic movements before 0700 or after 2100.

2. AIRCRAFT NOISE ASSESSMENT

2.1 Current U.K. government policy on the assessment of aircraft noise is given in the Future of Air Transport White Paper of December 2003, and in Planning Policy Guidance note PPG 24 (Planning and Noise, September 1994).

2.2 In the White Paper, the Government's advice on aircraft noise is, in brief and with respect to this case:

- Aircraft noise is to be measured using the equivalent continuous sound level, L_{Aeq}, and for daytime assessed over the period 0700 to 2300 hours;
- The approximate onset of significant community annoyance is represented by the 57 dB(A) L_{eq} (i.e. 57 dB $L_{Aeq,16h}$) noise contour.

2.3 In the White Paper the noise consequences of airport expansions are considered in terms of the local exposure to 57 dB $L_{Aeq,16h}$ and above. The exposure is determined for the 92-day Summer period, mid-June to mid-September. There is no separate consideration of weekday and weekend noise. It is recognised that weekends are more sensitive in cases where there is impact on residential properties. The degree to which any weight is given to this depends upon the number of residential properties affected and the extent of any impact.

2.4 The DEFRA e-Digest Statistics (Noise Pollution 8th April 2005) advise in a similar manner that the L_{Aeq} index should be used for aircraft noise, and that:

57 dB $L_{Aeq,T}$ approximates to the onset of significant community disturbance
63 dB $L_{Aeq,T}$ represents moderate disturbance
69 dB $L_{Aeq,T}$ represents high disturbance.

2.5 The change in activity in this case is for a maximum 26-day period, not the full 92-day Summer period used for normal assessments in accordance with policy.

2.6 These applications relate to the UK London Olympics 2012, an international sporting event of global significance. This is relevant to the assessment of the applications.

2.7 The Civil Aviation Authority advises in its Guidance on the Application of the Airspace Change Process (publication CAP 725) on the possible use of well-established response relationships between particular levels of aircraft noise exposure and the L_{eq} contours. It advises that for exposure in the range 57-60 dB $L_{Aeq,\ 16h}$ typically 11.1% of people so exposed would report being highly annoyed. The implication is of course that a very large majority, 88.9%, would not.

2.8 The CAA also advises that for exposure in the range 60-63 dB $L_{Aeq,\ 16h}$ typically 18% of people so exposed would report being highly annoyed. The implication is of course that a very large majority, 82%, would not.

2.9 There is evidence that correlates the degree of annoyance to the purpose of the flight and the perception of whether it is necessary. For instance, an Air Ambulance helicopter is more likely to be tolerated than a helicopter with no perceived legitimate purpose.

2.10 The Olympics air traffic movements, which would support a one-off event of global significance strongly supported by the U.K. government, may fall in this more acceptable category of tolerance. Any annoyance may therefore be reduced, below the levels reported in CAP 725, by what might be termed the “Olympic factor”.

3.0 DUNSFOLD AERODROME AIRCRAFT NOISE APPRAISAL (2012)

3.1 Effect of Proposed Temporary Increase in Summer Movements

3.1.1 Figure 4 presents the 57 dB $L_{Aeq,16h}$ contour based on a 92-day assessment for operations by a typical mix of business aviation aircraft carrying out the deemed maximum 5,000 annual air traffic movements evenly spread across the year (Current Summer), together with the same contour for the maximum temporary increase sought of 6,560 annual movements (Olympic Summer).

3.1.2 The Current Summer contour, compatible with the onset of significant community disturbance at 57 dB $L_{Aeq,16h}$, is contained within the Aerodrome site.

3.1.3 The Olympic Summer 57 dB $L_{Aeq,16h}$ contour crosses the A281 Horsham Road to the east and just reaches Alfold Road to the west. There is only 1 residential property within this contour, Garden Cottage on Alfold Road.

3.1.4 Figure 4 also presents the 57 dB $L_{Aeq,16h}$ contour for a weekday with the additional Olympics-related aviation activity taking place, based on worst case daily exposure and a 26-day assessment period. There are only 13 residential properties exposed to 57 dB $L_{Aeq,16h}$ and above. Of these, none is exposed to 63 dB $L_{Aeq,16h}$ or above. This worst case scenario also presupposes that the route (or track) flown is identical every time such that these 13 properties are overflown every time. In reality, this is unlikely to occur.

3.1.7 It can be concluded that the forecast noise level is well within a tolerable range, and that the impact is very limited in terms of the number of properties affected, magnitude and duration.

3.2 Effect of Extension in Weekday Operating Hours

3.2.1 The main assessments of transportation noise in U.K. use two time periods, namely

Daytime	0700 – 2300
Night-time	2300 – 0700

3.2.2 No night-time air traffic movements are proposed, and indeed none is proposed after 2100.

3.2.3 In terms of the extensions of time sought, there is no good reason for any significant adverse local reaction.

3.3 Effect of Extension in Weekend Operating Hours

3.3.1 Weekends are generally regarded as being more sensitive than weekdays. However, as stated above, the worst case scenario is that only 13 properties will be exposed to 57 dB $L_{Aeq,16h}$ and above and none to 63 dB $L_{Aeq,16h}$ or above. There are weekend flights at present, although these are generally confined to Saturday mornings. There will be no night-time flights at weekends by reason of these proposals. As referred to above, the modern business jets in question are not very noisy and their noise builds and recedes quite quickly (usually in less than 30 seconds) without being unduly intrusive.

4. SUMMARY AND CONCLUSIONS

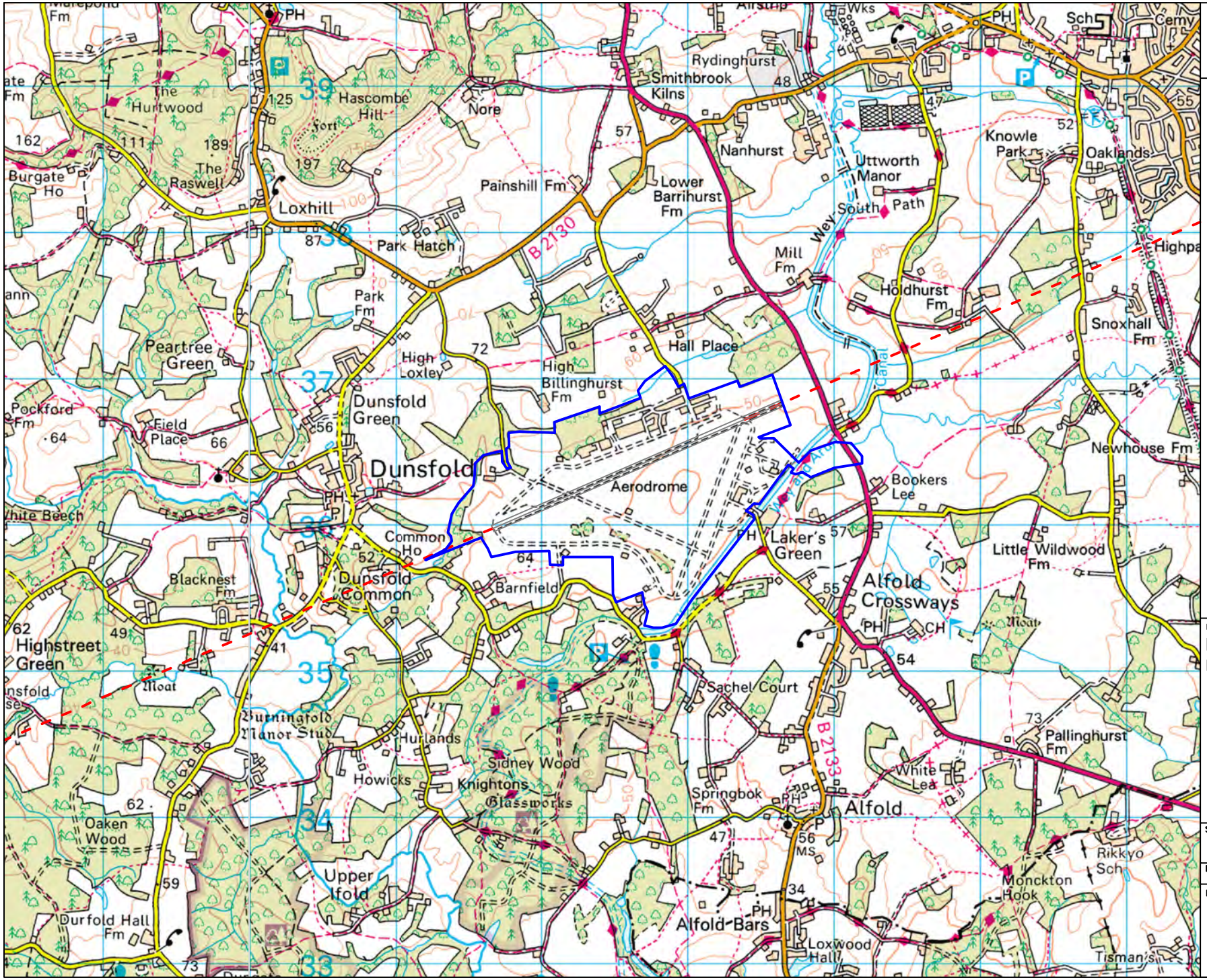
4.1 The forecast noise level from these proposals is well within a tolerable range, and any impact even on a worst case basis is very limited in terms of the number of properties affected, magnitude and duration.

4.2 On a worst case scenario, a 92-day assessment in accordance with policy shows that only 1 property will be exposed to 57 dB $L_{Aeq,16h}$ and above and none at all to 63 dB $L_{Aeq,16h}$ or above.

4.3 On a worst case scenario, a 26-day assessment (departing from policy) shows that only 13 properties will be exposed to 57 dB $L_{Aeq,16h}$ and above and none at all to 63 dB $L_{Aeq,16h}$ or above.

4.4 Modern business jets are not very noisy and their noise builds and recedes quite quickly (usually in less than 30 seconds) without being unduly intrusive.

4.5 These worst case scenarios are unlikely to occur. The likely noise effect of these proposals is therefore likely to be even less than the very limited impact of the worst case scenarios.



Bickerdike Allen Partners
121 Salusbury Road London NW6 6RG
Tel: 020 7625 4411 Fax: 020 7625 0250
e-mail: mail@bickerdikeallen.com

Legend

- Runway Extended Centreline
- Site Boundary (Approximate)

Drawing Title

DUNSFOLD AERODROME LOCATION PLAN

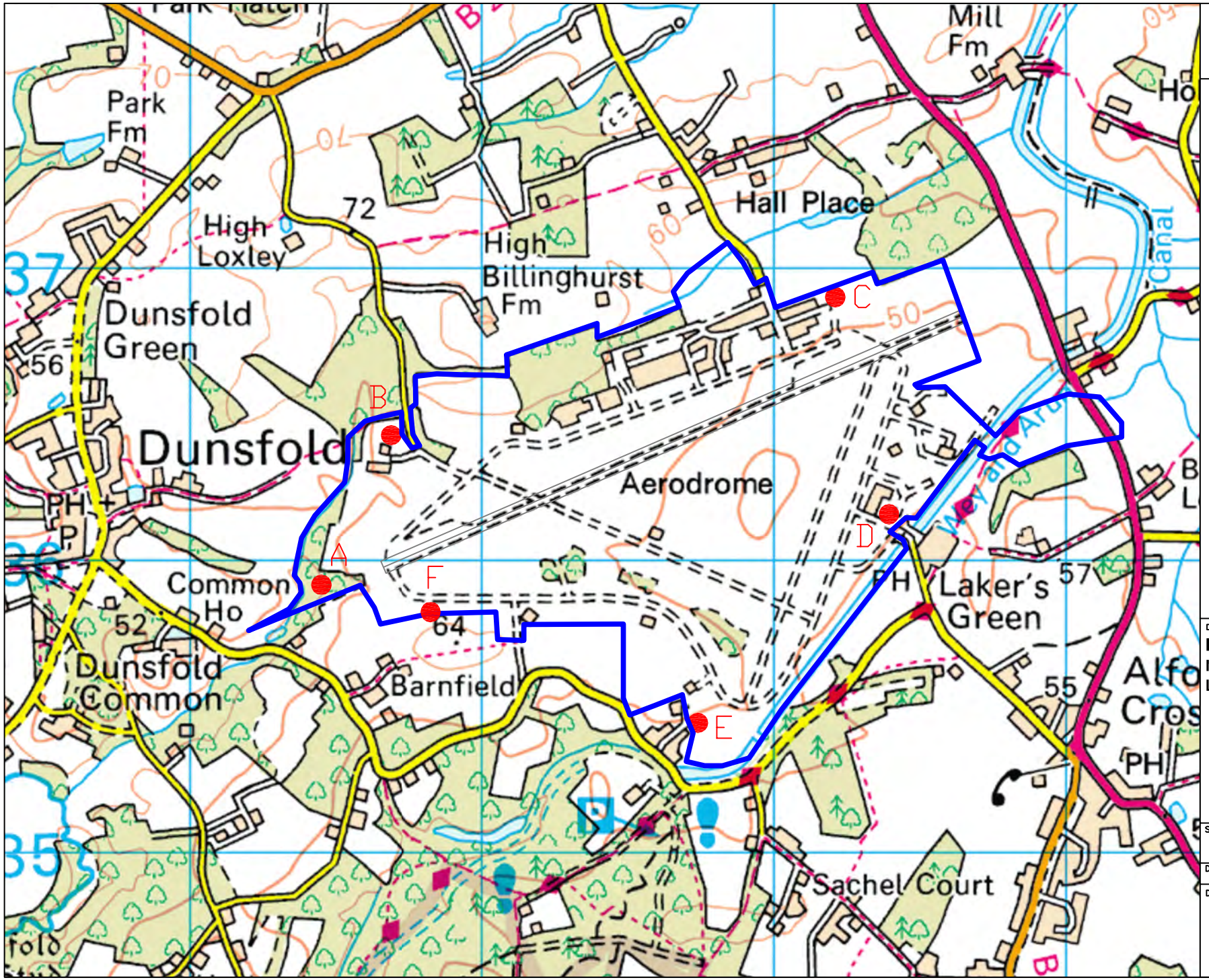
Scale at A3

1:25,000

Date: February 2012

Drawing Number

Figure-1



Bickerdike Allen Partners
121 Salusbury Road London NW6 6RG
Tel: 020 7625 4411 Fax: 020 7625 0250
e-mail: mail@bickerdikeallen.com

Drawing Title

DUNSFOLD AERODROME NOISE MONITOR LOCATIONS

Scale at A3

1:12,500

Date:

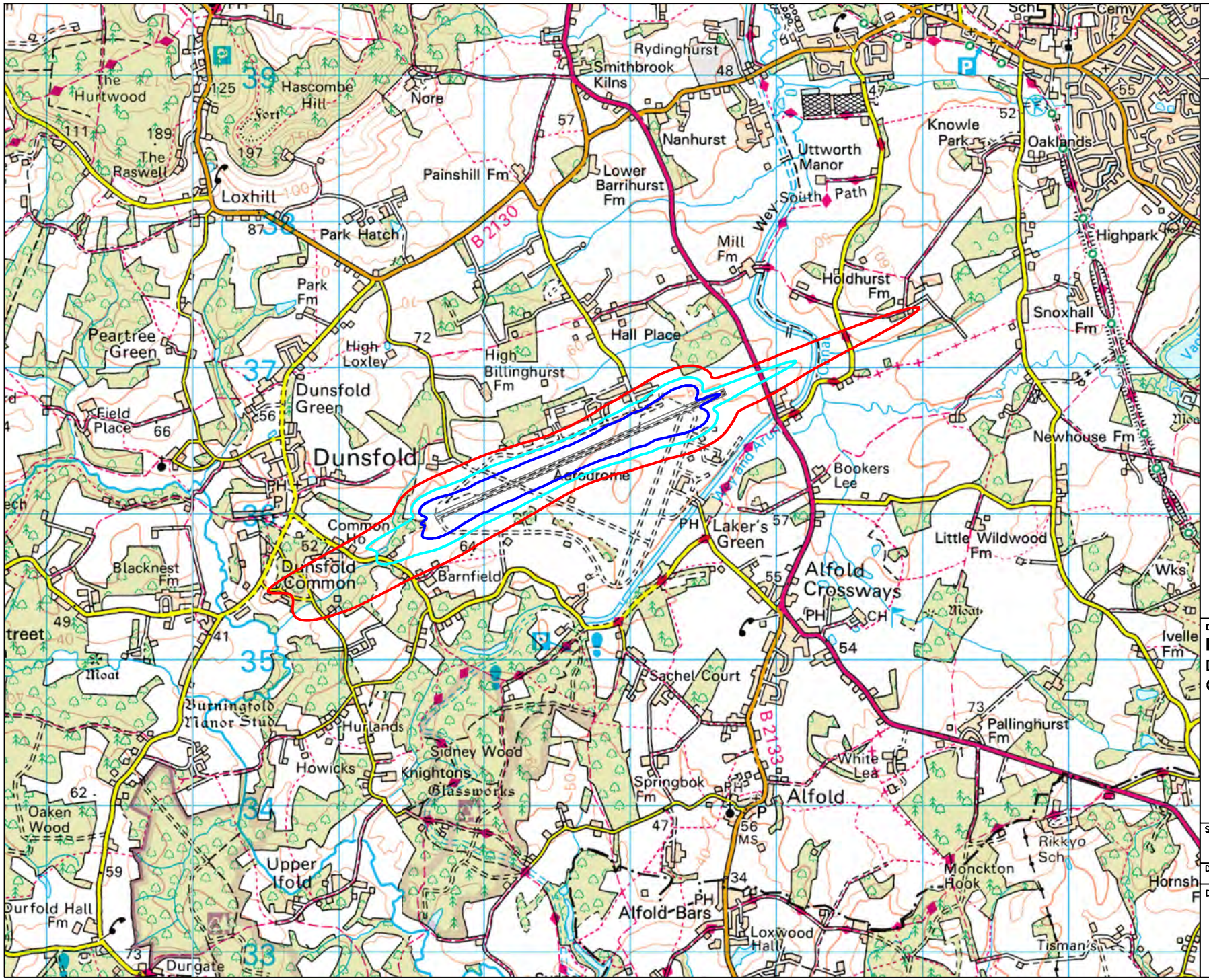
Februart 2012

Drawing Number

Figure-2

PAST	NOISE CHARACTERISTICS (dB SEL @ 1000ft)		PRESENT	NOISE CHARACTERISTICS (dB SEL @ 1000ft)	
	LANDING	TAKE-OFF		LANDING	TAKE-OFF
 BAe Harrier	94	112	 CL601	80	89
 BAe Hawk	78	105	 King Air 200	82	87

Figure 3: Dunsfold Aircraft [Past and Present]



Bickerdike Allen Partners
121 Salusbury Road London NW6 6RG
Tel: 020 7625 4411 Fax: 020 7625 0250
e-mail: mail@bickerdikeallen.com

Legend

- Current Summer
- Olympic Summer
- Olympic Weekday

Drawing Title

DUNSFOLD AERODROME

Daytime Noise Contour Comparison - 57 dB L Aeq,16h

Scale at A3

1:25,000

Date: February 2012

Drawing Number

Figure-4

APPENDIX A

GLOSSARY OF ACOUSTIC TERMS

Acoustic Terms

Sound

This is a physical vibration in the air, propagating away from a source, whether heard or not.

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} Pascals) and the threshold of pain is around 120 dB.

The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in Watts. The sound power level, L_w is expressed in decibels, referenced to 10^{-12} Watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules which transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

A-Weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

Environmental Noise Descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.

$L_{Aeq,T}$ The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.

Ambient Noise

Usually expressed using $L_{Aeq,T}$ unit, commonly understood to include all sound sources present at any particular site, regardless of whether they are actually defined as noise.

Background Noise

This is the steady noise attributable to less prominent and mostly distant sound sources above which identifiable specific noise sources intrude.

Sound Transmission In The Open Air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law. In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB.

Road traffic noise is a notable exception to this rule, as it approximates to a line source, which is represented by the line of the road. The sound energy radiated is inversely proportional to the area of a cylinder centred on the line. In decibel terms, every time the distance from a line source is doubled, the sound pressure level is reduced by 3 dB.

Factors Affecting Sound Transmission In The Open Air

Reflection

When sound waves encounter a hard surface, such as concrete, brickwork, glass, timber or plasterboard, it is reflected from it. As a result, the sound pressure level measured immediately in front of a building façade is approximately 3 dB higher than it would be in the absence of the façade.

Screening And Diffraction

If a solid screen is introduced between a source and receiver, interrupting the sound path, a reduction in sound level is experienced. This reduction is limited, however, by diffraction of the sound energy at the edges of the screen. Screens can provide valuable noise attenuation, however. For example, a timber boarded fence built next to a motorway can reduce noise levels on the land beyond, typically by around 10 dB(A). The best results are obtained when a screen is situated close to the source or close to the receiver.

Meteorological Effects

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradients are variable and difficult to predict.