FARNBOROUGH AIRPORT SUSTAINABILITY

Sections 106 and 299A
Town and Country Planning Act 1990

Interim INM7 Noise Assessment 2024
Predictive Contours July to December 2024

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FIGURES

APPENDIX

INTRODUCTION

1.1 In compliance with the requirements of paragraph 2.5 a), c), d) and e) of the Section 106/299A Town and Country Planning Act 1990 agreement, between Rushmoor Borough Council (RBC) and TAG Farnborough Airport (TFA), this report provides details of the outcome of the latest Integrated Noise Model Study run for business aviation operations at Farnborough.

This report covers the first half of 2024 and includes predictive contours for the second half of 2024 based on current forecasting. The INM modelling process was conducted by Bickerdike Allen Partners (BAP), compliance with paragraph 2.5e validation on the model is generally only carried out on the annual assessment.

1.2 Paragraph 2.5 of the planning agreement states:

a) At the end of the 2nd quarter in each successive year the INM model will be used to produce noise contours based on the preceding 6 months' actual movements and a second set of theoretical contours for the next 6 months

c) These sets of contours shall be supplied to the council no later than 6 weeks after the model has been used.

d) For paragraphs 2.5 a) and c) the INM model shall use a simplified departure track representation and such simplified departure track representations shall be made after inspection of the spread of actual aircraft tracks on site.

e) For paragraphs 2.5 a) and c) the INM model shall include terrain information and at the end of each year the results shall be compared between the individual INM predicted levels with the measured levels determined by the fixed and mobile monitoring points in and around the site.

This report is intended to address the requirements of paragraph 2.5, a), c), d) and e).

1.3 The use of the INM model, to produce noise contours relating to business aircraft movements at Farnborough, assess the noise impact on the surrounding area under existing conditions and the potential impact of the predicted growth of the airport as permitted by the Planning Agreement.

1.4 Civil operations at Farnborough are restricted to 'daytime' hours only (as defined by PPG 24 "Planning and Noise"). The airport is open from 07:00 to 22:00 hrs on weekdays and 08:00 to 20:00 hrs at weekends. The modelling process uses representative tracks produced from inspection of real track data, to construct contours that represent the time-averaged noise of operations.

1.5 In compliance with clause 2.7 of the Planning Agreement, BAP were selected to conduct the annual noise assessment in January and the interim noise assessment in July. The next annual assessment will be undertaken in January 2025 and will be the annual noise assessment.

1.6 For this report modelling was completed for the period January to June 2024, using version 7.0d of the FAA's Integrated Noise Model (INM).

1.7 As in previous reports, the contours displayed within this report are referenced against the work commissioned by RBC from Acoustic Technology Ltd during the consideration of the original Airport planning application. The outcome of this work established contours that are referred to in paragraph 2.1a of the Agreement, annotated as the "control contours" within this document.

1.8 In accordance with clause 12.1 of the planning agreement, a further reduction in area of the control contours has been applied. The reductions are as follows:

- a 72.5% reduction of the land area within the 55dB(A) $L_{Aeq,16h}$ contour
- a 60.0% reduction of the land area within the 60dB(A) $L_{Aeq,16h}$ contour

The resultant effect on the land area within the control contours is displayed in Table 1.

1.9 The period of operation on which this report is based is the period January to June 2024. Aircraft operations during this period consisted of 14,587 movements of the categories required to be included under the Planning Agreement.

2 METHODOLOGY

2.1 In accordance with advice from independent acoustic consultants and with the agreement of RBC, INM 7.0d has been used for the noise contour modelling procedure. This is the most recent version of the software and allows helicopter movements to be integrated into the modelling process together with consideration of surrounding terrain.

2.2 The core stages of the contour methodology are as follows:

- Preparation of an INM study using relevant data from the latest edition of the UK Aeronautical Information Package, including the dimensions and positioning of the runway.
- Creation of user defined arrival profiles to reflect the steeper 3.5-degree approach in operation at Farnborough.
- Production of simplified departure and arrival track representations following inspection of actual track data from the Brüel and Kjær Track Monitoring System. Representations include designation of Noise Abatement Procedure tracks and procedure cancellation tracks. Dispersion is applied to these tracks to reflect the variations in routes flown and observed in the actual track data.
- Determination of the split of traffic in terms of runway and operation (06 / 24 and departure / arrival) and the split of departure operations on each of the identified routes. This is achieved from analysis of the Air Traffic Control Movement Logs.
- Summarising the actual movement by aircraft type and then the application of representative INM aircraft types using a substitutions list for those types where noise data is not included within the model.
- Running of the contour model from an INM input using actual data to provide movement numbers for the modelled flight tracks.

Preparation of input files

2.3 Flight data used in this study was taken from radar tracks processed by Farnborough's Brüel and Kjær Noise and Track Monitoring System (NTMS). The raw data has been inspected and used to produce representative tracks which are in turn used by the model in the prediction of the noise contours.

2.4 INM is primarily designed to deal with commercial air traffic rather than the specialist business aircraft types operating at Farnborough. Aircraft types in operation at Farnborough, if not available within the standard model profiles, are represented by the closest available substitutes on the INM Substitutions List. Where aircraft are not adequately represented by aircraft on the INM substitutions list, appropriate substitutions are made by reference to engine types. All substitutions used by BAP in this assessment are detailed in Appendix 1.

Predicted Contours

2.5 The predicted contours for the period July to December 2024 have been generated using movement data from the preceding six months (representative tracks and aircraft type mix). The predicted number of movements for this period is 16,277 based on forecast information.

3 RESULTS

3.1 The INM 7.0d contours produced for this reporting period are shown together with the RBC 1997 Planning Contours in Figure 1. Predicted contours using the January to June 2024 fleet and movement mix, are shown in Figure 2. Both contours allow for helicopter movements which are assumed to show the same increase in numbers from the first to the second half of the year. When examining the contours there are several important points to note:

- The planning agreement refers only to 55 and 60dB(A) $L_{Aeq,16h}$ however a third 65dB(A) $L_{Aeq,16h}$ contour has been added for information.
- The contour areas for this reporting period are within the planning permission control contour areas, as amended through clause 12.1 of the planning agreement.
- The predicted contour areas for this reporting period are within the planning permission control contour areas, as amended through clause 12.1 of the planning agreement.
- The contours are based on the assumptions and data inputs as described within this report.
- The contours should be regarded as indicative only and represent time averaged noise levels expressed as dB(A) $L_{Aeq,16h}$. This measure represents the sound energy released as noise varies over time, expressed as an average for the relative time period.
- Control Contours included as part of the planning agreement between RBC were theoretical in that they used conceptual aircraft tracks. The contours attached to this document are generated using representative tracks created through inspection of actual radar flight track data.
- Helicopter movements are included in the modelling process of this report, following the use of INM7.0d and advice from independent noise specialists.
- The steeper than standard angle of approach used at Farnborough (3.5 as opposed to 3 degrees) has been allowed for; increasing the modelled height of arriving aircraft.
- The INM modelling process for this report has not been subjected to validation against measured noise levels at the Airport's Noise Monitoring Terminals (NMTs). As demonstrated by the exercise reported at the Public Inquiry in 2010, some of the INM standard aircraft substitutions used older aircraft types which typically overestimate the noise levels of the more modern types operating at Farnborough.

Comparison of total land area within each Noise Contour

3.2 Tables 1 and 2 compare the total land area within each contour for both the "control contours" and the most recently produced actual and predicted contours.

Table 1: Predicted noise contour areas, 20,000 movements at 1997 mix (Control Contours)

dB(A) $L_{Aeq,16h}$	Predicted 20,000 movements 1997 mix (km^2)	Amended Control Contour Areas as per clause 12.1 of the S106 (29/10/2010) (km^2)
55	9.07	6.58
60	4.03	2.42
65	1.70	n/a

Table 2: Contour areas: Actual Jan – Jun 2024 and Predicted Jul - Dec 2024

dB(A) $L_{Aeq,16h}$	Actual contour areas Jan to Jun 2024 (km^2)	Predicted contour areas, Jul to Dec 2024 (km^2)
55	2.06	2.24
60	0.89	0.95
65	0.42	0.45

4. CONCLUSION

4.1 Contours and predicted contours for this reporting period are within the planning permission area limit. Their size is within the original planning consent contours, reflecting the change in aircraft operations on which the modelling process is based, and the allowance for the steeper approaches used.

5.0 SUMMARY

Noise contours for Farnborough Airport have been produced for the first half of 2024, based on the actual movements, and for the second half of 2024, based on the latest forecast. These were produced using the same methodology as that used to produce the actual annual 2023 and forecast annual 2024 noise contours. The areas of the contours are within the planning permission limits.

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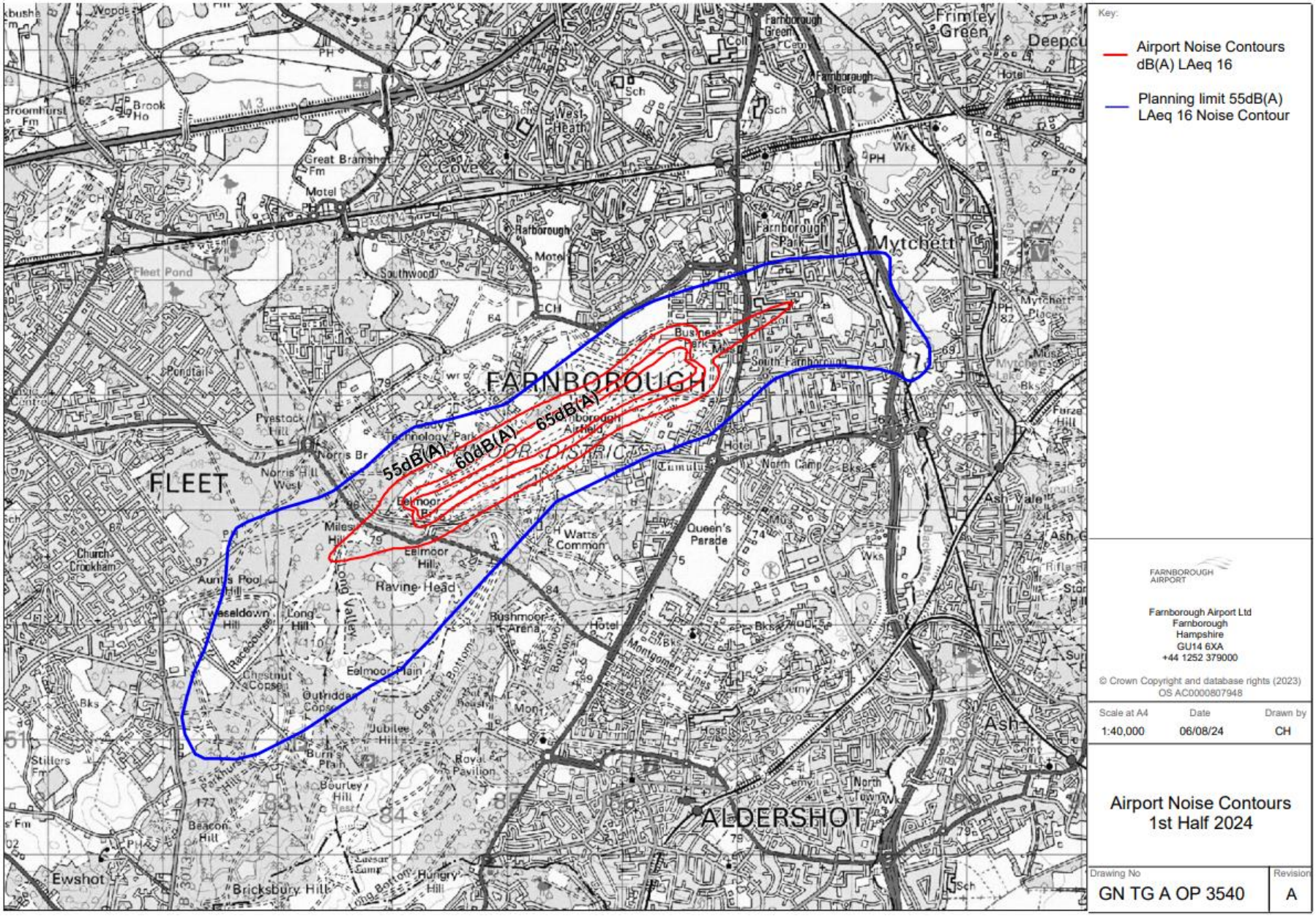
06/08/2024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Planning limit 55dB(A) LAeq 16 Noise Contour
55dB(A)
60dB(A)
65dB(A)
FARNBOROUGH
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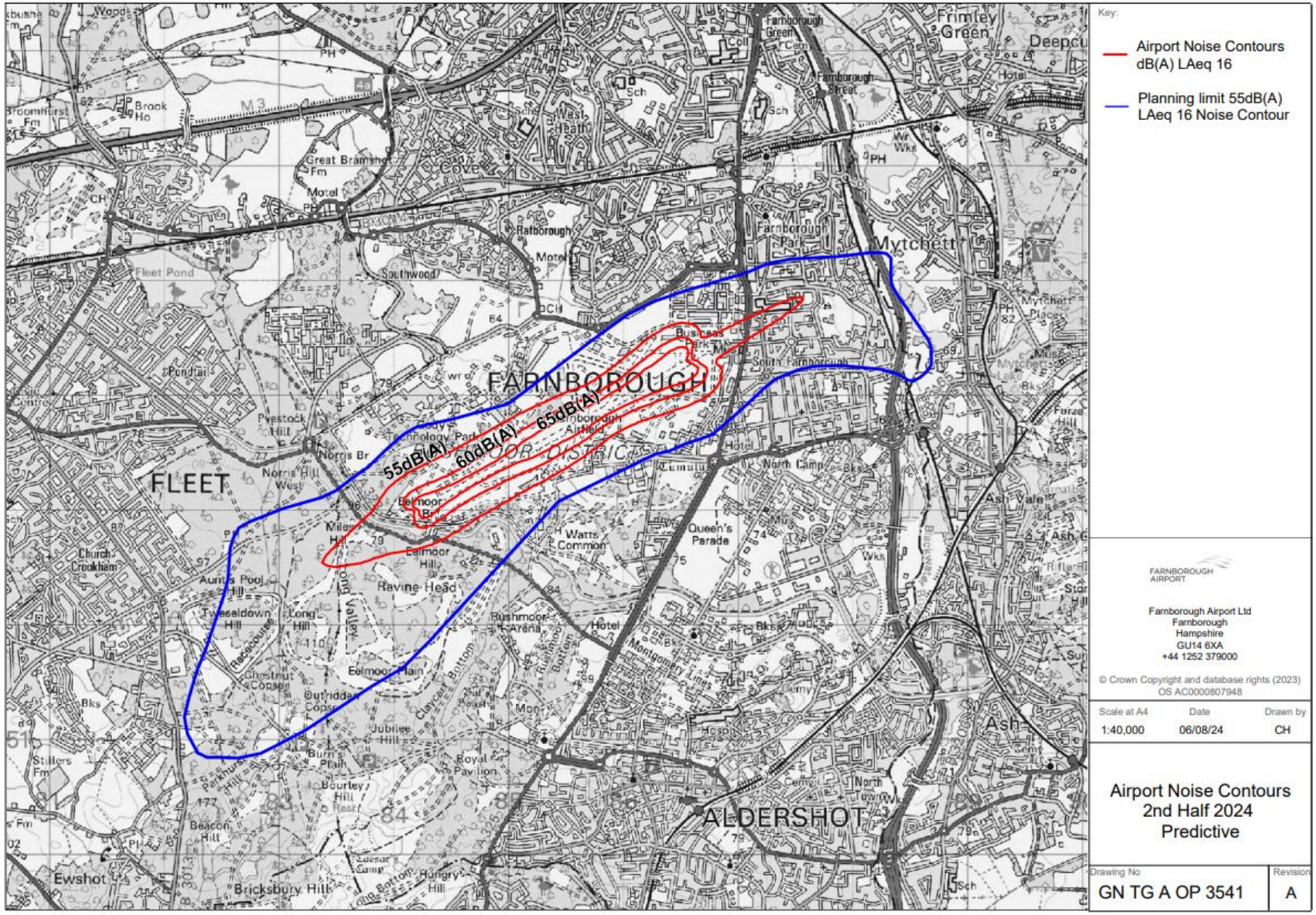
Drawn by CH
Airport Noise Contours 1st Half 2024
Drawing No GN TG A OP 3540
Revision A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Airport Noise Contours 2nd Half 2024 Predictive
Drawing No GN TG A OP 3541
Revision A

Appendix 1

INM 7.0d Substitution List

Key:

Aircraft Operational Code: Operational ATC aircraft type identification

INM code: Equivalent aircraft code as used by INM programme

Notes: Operational codes do not necessarily reflect correct ICAO codes

The 20 most common aircraft types have been part of the validation exercise, and have been denoted “Validated”. See Appendix 2 for details.

Operational Code	INM Code	Operational Code	INM Code
A220	737700	CRJ9	CRJ9-LR
A318	A319-131	DA42	BEC58P
A319	A319-131	DA62	BEC58P
A320	A320-211	E135	Validated
ASTR	IA1125	E135N	EMB145
B250	Validated	E145	EMB145
B350	CNA441	E170	EMB170
B733	737300	E190	EMB190
B734	737400	E35L	Validated
B737	737700	E50P	CNA510
B738	737800	E545	CNA55B
BE19	1900D	E550	Validated
BE20	Validated	E55P	Validated
BE30	CNA441	EA50	ECLIPSE500
BE40	MU3001	F2LX	Validated
BE9L	CNA441	F2TH	Validated
C25A	Validated	F900	F10062
C25B	CNA525C	F9LX	F10062
C25C	CNA525C	FA6X	GV
C25M	CNA525C	FA7X	Validated
C425	CNA441	FA8X	F10062
C510	CNA510	G150	IA1125
C525	Validated	G200	CL600
C52A	Validated	G280	CL601
C550	CNA500	G450	GIV
C560	MU3001	G550	Validated
C56X	Validated	G650	Validated
C670	CIT3	G650ER	Validated
C680	CNA680	GA5C	GV
C680A	Validated	GA6C	GV
C68A	Validated	GA7C	GV
C700	CNA680	GALX	CL600
C750	CNA750	GL5T	Validated
CL30	CL601	GL6T	Validated
CL35	Validated	GL7T	Validated
CL60	Validated	GLEX	Validated
CL605	Validated	GLF4	GIV
CL65	Validated	GLF5	Validated
CL850	Validated	GLF6	Validated
CRJ2	Validated	H25B	LEAR35
CRJ7	CRJ9-ER	H25C	LEAR35

Operational Code	INM Code
H750	LEAR35
HA-420	CNA510
HA4T	CL600
HDJT	CNA510
L550	Validated
LJ31	LEAR35
LJ35	LEAR35
LJ40	LEAR35
LJ45	LEAR35
LJ60	CNA55B
LJ75	LEAR35
P180	SD330
P28A	PA28
PC121	Validated
PC24	Validated
PRM1	LEAR35
TBM7	CNA208

Helicopters

Operational Code	INM Code
A109	A109
A109A	A109
A139	SA330J
A169	S76
AS35	SA355F
AS65	SA365N
AW169	S76
B206	B206L
B429	B429
EC15	SA365N
EC35	EC130
EC45	B429
H145	B429
H160	SA330J
S76	S76
SKING	S61

Appendix 2

Validation Adjustments

For each validated aircraft type, the measured noise levels obtained from the airport's permanent noise monitors located at Farnborough College and Tweseldown Racecourse have been compared with the default modelled noise levels at the same locations.

For each aircraft type, an INM aircraft type has been selected along with a multiplier to the number of aircraft movements. This multiplier serves to modify the LAeq noise level, for example a multiplier of 2 will add approximately 3 dB to the noise level for that aircraft type. The selections have been based on minimising the difference between the predicted and measured results at the noise monitors.

The table below shows, for each validated aircraft type, the INM type and multiplier used.

Operational Code	Arrivals		Departures	
	INM Code	Multiplier	INM Code	Multiplier
BE20	CNA441	3.50	CNA441	1.45
C25A	CNA525C	1.30	CNA55B	0.45
C525	CNA525C	1.40	CNA55B	0.75
C56X	CNA560XL	0.60	CNA560XL	0.35
C68A	CNA680	0.75	CNA750	0.30
CL35	CL601	0.75	CNA560XL	0.45
CL60	CL600	1.40	CNA560XL	0.40
CRJ2	CL601	1.70	CNA560XL	0.75
E35L	EMB145	0.85	F10062	0.30
E550	CNA55B	0.50	CNA55B	0.35
E55P	CNA510	1.50	CNA560XL	0.50
F2TH	CL600	0.90	F10065	0.15
FA7X	F10062	0.65	F10065	0.45
GL5T	GV	0.65	F10065	0.40
GL7T	GV	0.85	F10065	0.45
GLEX	GV	0.65	F10065	0.45
GLF5	GV	0.60	F10065	0.30
GLF6	GV	0.65	F10065	0.35
PC12	CNA208	0.80	CNA208	0.30
PC24	CNA55B	0.70	CNA55B	0.80