FARNBOROUGH
AIRPORT

Sections 106 and 299A
Town and Country Planning Act 1990

Annual INM7 Noise Assessment 2020
Predictive Contours January to December 2021

CONTENTS

1. Introduction

2. Methodology

3. Results

4. Conclusions

FIGURES

1. Airport Noise Contours 2020, against the 1997 Planning Application Contours

2. Airport Noise Contours Predicted, 2021 against the 1997 Planning Application Contours

APPENDIX

1. INM 7.0d Substitution List

INTRODUCTION

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

This report is for the calendar year 2020 and includes predictive contours for 2021, based on forecast growth in movement numbers and aircraft track data from the study year.

1.2 Paragraph 2.5 of the planning agreement states:

b) At the end of the 4th Quarter in each year the INM model will be used to produce noise contours based on the actual movements in the past year and a second set of theoretical contours for the year ahead

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, b), c), d) and e).

1.3 The intended use of the INM, to produce noise contours relating to business aircraft movements at Farnborough, is to 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 FAL are restricted to ‘daytime’ hours only (as defined by PPG 24 “Planning and Noise”). The airport is open from 07:00 to 22:00 hours on weekdays and 08:00 to 20:00 hours at weekends and bank holidays. The modelling process uses representative tracks produced from study of real track data, to construct contours that represent the time averaged noise of operations.

1.5 Following the use of INM 7.0d in the Annual Noise Assessment, an audit of the methodology was undertaken in January 2020 Bickerdike Allen Partners were selected to undertake the annual audit, the results of which are published in the FAL Annual Performance Monitoring Report 2020, in compliance with clause 2.7 of the Planning Agreement.

1.6 For this report modelling was completed using Version 7.0d of the FAA’s Integrated INM. This version of INM includes aircraft types that better represent those in operation at Farnborough Airport together with revised aircraft substitutions.

1.7 As in previous reports, the contours displayed within this report reference the work commissioned by RBC from Acoustic Technology Ltd during the consideration of the original FAL planning application. The outcome of this work established contours 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, further reductions in area of the control contours apply. 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

Table 1 displays the resultant effect on the land area within the control contours.

1.9 Aircraft operations during this study period consisted of 15,467 movements of movement types required by the Planning Agreement. This number is lower than previous years due to the impact of the COVID-19 pandemic. The exclusion of movements operating prior to ACP implementation was compensated for by using a modelling period of 309 days when calculating average daily movements.

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, the most recent version, includes helicopter movements and allows for 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 FAL.
- Production of simplified departure and arrival track representations following inspection of actual track data from the EMS Brüel & Kjær Aircraft Noise and Operations Management System (ANOMS). Representations include designation of Noise Abatement Procedure tracks and procedure cancellation tracks. Application of dispersion to reflect the variations in track observed from ANOMS 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, through analysis of the Air Traffic Control Movement Logs.
- Summarising the actual movements by aircraft type and application of representative INM aircraft types using a substitutions list for those types where noise data is not included within the model.
- Validation of the noise modelling predictions by comparison of the predicted noise levels of individual movements with those measured by the fixed Noise Monitoring Terminals (NMTs). Use of the most common aircraft types ensures sufficient data for robust validation.
- Running of the contour model from an INM input, following application of the validation results to the summarised actual movements and the split of activity by route.

Preparation of input files

2.3 This study uses flight data taken from radar tracks processed by ANOMS. Inspection of raw data enables production of representative tracks, in turn used by the model for noise contour prediction.

2.4 INM's primary design is for application to commercial air traffic rather than specialist aircraft types operating at FAL. Substitutes from the INM Substitutions List represent aircraft types not available within the standard model profiles. If not adequately represented by aircraft on the INM substitutions list, allocation of appropriate substitutions use reference to engine types. Appendix 1 details all substitutions applied.

Predicted Contours

2.5 The predicted contours, generated using actual movement data from this study period (flight tracks and aircraft mix), assume a total of 26,858 reported movements over the course of 2021.

3 RESULTS

3.1 Figure 1 displays a comparison between this INM contour assessment and the RBC 1997 Planning Contours. Figure 2 displays predicted contours for 2020 against the same 1997 contours. Both contours include helicopter movements following the same trend as fixed wing movements in terms of movement numbers. 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 study period are within the planning permission control contour areas, as amended under clause 12.1a of the planning agreement.
- The predicted contour areas for the study period are also within the planning permission control contour areas, as amended under clause 12.1a of the planning agreement.
- The contours use 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 period.
- Control Contours included as part of the planning agreement between RBC were theoretical and used conceptual aircraft movement routes. The contours attached to this document are generated using representative tracks created through inspection of actual flight track data.
- Helicopter movements are included in the modelling process.
- The steeper angle of approach used at FAL (3.5 as opposed to 3 degrees) has been allowed included in the model to correctly represent the height of arriving aircraft.
- Comparison of INM predicted noise levels for individual aircraft movements against measured noise levels at the NMTs validates the assessment. This shows, as with the exercise reported at the Public Inquiry in 2010, that some of the INM standard aircraft substitutions used older aircraft types that over-estimated the noise levels of the more modern types operating. The standard substitutions are revised annually, (refer to Appendix 1).

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 12.1a 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 2020 and Predicted 2021

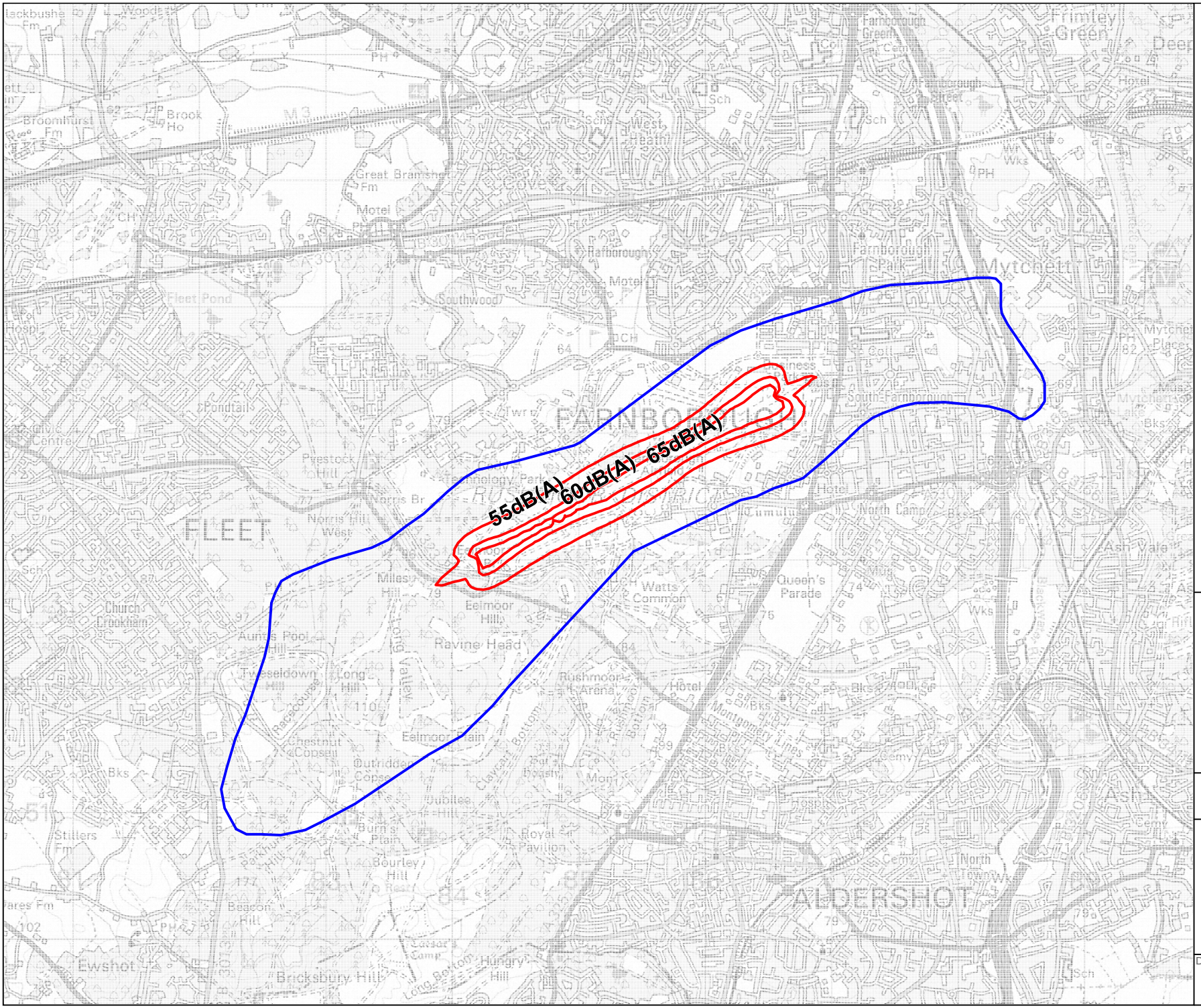
dB(A) $L_{Aeq,16h}$	Actual contour areas 2020 (km^2) (based on 15,467 actual movements)	Predicted contour areas, 2021 (km^2) (based on 26,858 movements at 2020 fleet mix)
55	1.38	1.87
60	0.65	0.83
65	0.29	0.38

4. CONCLUSION

4.1 Contours produced for 2020 and the predicted contours for 2021 are within the planning permission area limit.

Miles H Thomas
Head of Sustainability and Planning

Farnborough Airport
www.farnboroughairport.com



Key:

- LAeq 16 Airport Noise Contour
- Planning limit 55dBA LAeq 16 Noise Contour

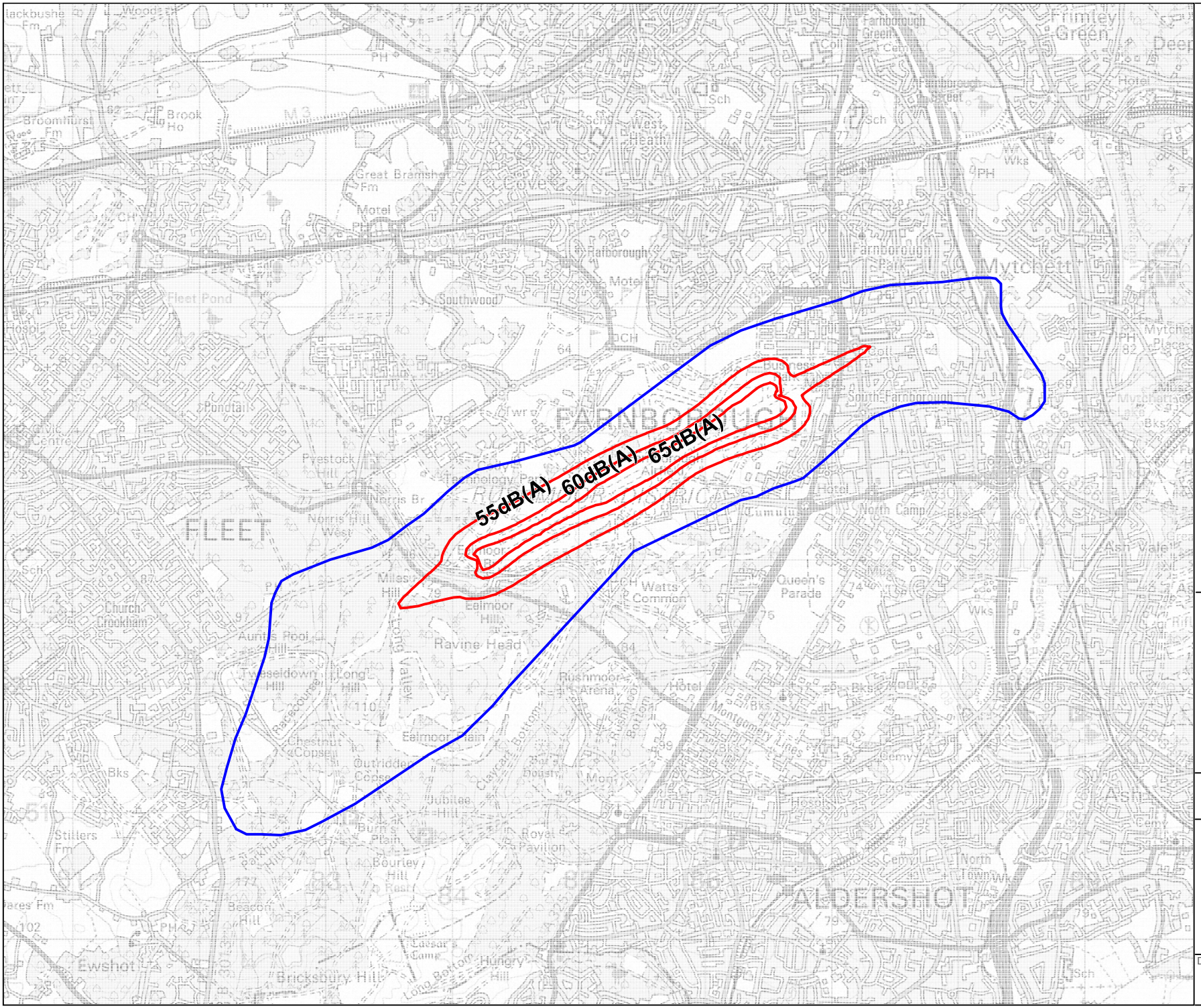
FARNBOROUGH AIRPORT

Farnborough Airport Ltd
Farnborough
Hampshire
GU14 6XA
+44 1252 379000

Scale at A4	Date	Drawn by
1:40 000	10/02/21	SG

Figure 1: Airport Noise Contours All 2020

Drawing No	Revision
GN TG A OP 3136	A



Key:

- LAeq 16 Airport Noise Contour
- Planning limit 55dBA LAeq 16 Noise Contour

FARNBOROUGH AIRPORT

Farnborough Airport Ltd
Farnborough
Hampshire
GU14 6XA
+44 1252 379000

Scale at A4	Date	Drawn by
1:40 000	10/02/21	SG

Figure 2: Airport Noise Contours All Predictive 2021

Drawing No	Revision
GN TG A OP 3137	A

Appendix 1

INM 7.0d Substitution List

Key:

Aircraft Operational Code: Operational ATC aircraft type identification

Substituted INM Aircraft code: Equivalent aircraft code as used by INM programme

N.B.

- Operational Codes do not necessarily reflect correct ICAO Codes.
- The standard aircraft INM departure profile was used for all aircraft entered.
- For arrivals profiles were created to reflect the steeper approach path in operation at FAL.

Operational Aircraft Code	INM Aircraft Code / Substitution Code
A20N	A320-232
A318	A319-131
A319	A319-131
A320	A320-232
ASTR	IA1125
B190	CNA441
B350	CNA441
B462	BAE146
B733	737300
B734	737400
B735	737500
B737	737700
B738	737800
B739	737800
BE20	CNA441
BE30	DO228
BE40	MU3001
BE9L	CNA441
BN2T	BEC58P
C152	CNA172
C172	CNA172
C25A	CNA525C/CNA55B
C25B	CNA525C
C25M	CNA500
C425	CNA441
C501	CNA500
C510	CNA510 / CNA560XL
C525	CNA525C
C550	CNA500
C551	CNA500
C560	MU3001
C56X	CNA560XL
C650	CIT3
C680	CNA680 / CNA750
C68A	CNA680 / CNA750
C700	CNA750
C750	CNA750
CL30	CL601
CL35	CL601 / CNA560XL
CL60	CL600 / CNA560XL
CRJ2	CL601 / CNA560XL
CRJ7	CRJ9-ER
CRJX	CRJ9-ER
D228	DO228
D328	DO328
DA42	BEC58P
DA62	BEC58P
E135	EMB145
E145	EMB145
E170	EMB170
E190	EMB190
E295	EMB190
E35L	EMB145 / F10062
E500	CNA20T
E50P	CNA510
E545	EMB145
E55P	CNA510 / CNA560XL
EA50	ECLIPSE500
F100	F10065
F2TH	CL600 / F10065
F900	F10062 / F10065
FA10	LEAR35

Operational Aircraft Code	INM Aircraft Code / Substitution Code
FA50	F10062
FA7X	F10062 / F10065
FA8X	F10062
G150	IA1125
G200	CNA750
G280	CL601
GA5C	GV
GA6C	GV
GA7	BEC58P
GALX	CNA750
GL5T	GV / F10065
GL7T	GV
GLEX	GV / F10065
GLF4	GIV
GLF5	GV / F10065
GLF6	GV / F10065
H25A	LEAR35
H25B	LEAR35 / CNA55B
H25C	LEAR35
HA4T	CL600
HDJT	CNA510
JS41	SF340
LJ31	LEAR35
LJ35	LEAR35
LJ40	LEAR35
LJ45	LEAR35
LJ55	LEAR35
LJ60	CNA55B
LJ75	CNA560XL
P180	SD330
PA31	PA31
PA32	GASEPV
PC12	CNA208 / DHC7
PC24	CNA525C
PRM1	LEAR35
RJ1H	BAE300
SB20	HS748A
SF34	SF340
SF50	ECLIPSE500

Helicopters

A109	A109
A119	A109
A139	SA330J
A169	S76
A189	S61
AS355	SA355F
AS365	SA365N
B06	B206L
B429	B429
EC20	SA341G
EC35	EC130
EC45	B429
EC55	SA365N
EH10	S65
EXPL	B407
H500	H500D
MD60	B407
R66	R44
S76	S76
S92	S70