

**OCCUPATIONAL AND ENVIRONMENTAL
MEDICINE WING**

NOISE AND VIBRATION DIVISION

Report: OEM/09/22

Date: August 22

**A REPORT ON MILITARY AVIATION NOISE
CONTOURS OF AIRCRAFT ACTIVITY AT RAF
NORTHOLT**



(Original signed)

██████████
Wing Commander
Officer Commanding
Environmental and Occupational Health Wing

(Original signed)

██████████
C1
Head of the Noise and Vibration Division

CONDITIONS OF RELEASE

This information is Crown Copyright and the intellectual property rights for this publication belong exclusively to the Ministry of Defence (MOD). No material or information contained in this publication should be produced, stored in a retrieval system or transmitted in any form outside MOD establishments except as authorised by both the sponsor and the MOD where appropriate.

**OCCUPATIONAL AND ENVIRONMENTAL MEDICINE WING
NOISE AND VIBRATION DIVISION**

ROYAL AIR FORCE CENTRE OF AVIATION MEDICINE

Report No: OEM/09/22

**A REPORT ON MILITARY AVIATION NOISE CONTOURS OF AIRCRAFT ACTIVITY AT
RAF NORTHOLT**

Executive Summary

1. The Noise and Vibration Division of the Royal Air Force Centre of Aviation Medicine was tasked by Chief Environmental and Safety Officer of the Royal Air Force to produce Military Aviation Noise Contours for RAF Northolt. This was undertaken in accordance with Joint Service Publication 418 and included station-based and visiting aircraft activity.
2. Military Aviation Noise Contours were produced using the Federal Aviation Administration's Aviation Environmental Design Tool Version 2d.
3. The Military Aviation Noise Contours shown at Annex A should be used as the basis for assessing the noise environment around RAF Northolt. The contours show the combined effect of all military and civilian aircraft at RAF Northolt in 2016 for different time domains and noise indices. The baseline year of 2016 was chosen as it was considered a representative year of normal operations.

Distribution

[REDACTED]

[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Contents

Section	Pages
Introduction	1
Background	1
Relevant Legislation and Guidance	1
Limitations and Exclusions from the Scope	2
Analysis	2
Results	3
Recommendations	3
Acknowledgements	3

Annex

A. RAF Northolt Military Aviation Noise Contours for L_{DEN} , $L_{Aeq,16\text{ hour}}$ without night movements and $L_{Aeq,16\text{ hour}}$ with night movements.

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE WING NOISE AND VIBRATION DIVISION

ROYAL AIR FORCE CENTRE OF AVIATION MEDICINE

Report No: OEM/09/22

A REPORT ON MILITARY AVIATION NOISE CONTOURS OF AIRCRAFT ACTIVITY AT RAF NORTHOLT

Author: [REDACTED]

Introduction

1. The Noise and Vibration Division (NVDiv) of the Royal Air Force Centre of Aviation Medicine (RAF CAM) was tasked by Chief Environmental and Safety Officer of the Royal Air Force to produce Military Aviation Noise Contours (MANCs) for RAF Northolt.

Background

2. RAF Northolt is located in west London, approximately six miles north of London Heathrow Airport, and is used by both military and civilian aircraft. It is home to units from the RAF and the Ministry of Defence. RAF Northolt operates in the VIP and general air transport roles with No. 32 (The Royal) Squadron operating AW109SP and BAe 146 aircraft. A selection of civilian aircraft also operate at RAF Northolt.

3. At the time of the assessment, RAF Northolt had one runway (07/25), which is 1685m long and 40m wide.

4. The last environmental noise survey of RAF Northolt was conducted in 2001 by NVDiv under the Noise Insulation Grant Scheme (NIGs). This was produced using physically measured data and is detailed in report OEM/67/01¹.

Relevant Legislation and Guidance

5. The primary legislation regarding environmental noise is set out in the Environmental Protection Act 1990². The MOD has exemption from clause 79(1)(g) of this Act [smoke and noise emitted from premises for operational and training activities so as to be prejudicial to health or a nuisance (this exemption extends to Scotland and Northern Ireland)]. MOD policy regarding environmental noise is outlined in JSP 418 Leaflet 04-1: Environmental Noise³, which states that the MOD must mitigate, as far as reasonably practicable, the effects of the environmental noise which its activities produce.

6. The MANCs at Annex A were created in accordance with the Environmental Noise Regulations 2006, No. 2238, Statutory Instruments⁴.

¹ NVDiv Report: OEM/67/01, dated December 2001.

² Environmental Protection Act 1990.

³ JSP 418 Leaflet 04-1: Environmental Noise.

⁴ Environmental Noise Regulations 2006, No. 2238, Statutory Instruments.

Limitations and Exclusions from the Scope

7. The MANCs detailed at Annex A include combined total aircraft movements at RAF Northolt during 2016.

8. The MANCs do not include Engine Ground Run (EGR) operations or flying circuits as the information was not supplied by RAF Northolt.

Analysis

9. To meet the customer requirement, 2016 baseline MANCs for RAF Northolt for station-based and visiting aircraft was created using the Federal Aviation Administration's Aviation Environmental Design Tool (AEDT) 2d.

10. AEDT is an internationally recognised noise prediction package and is used extensively within the UK for the modelling of civil/commercial aircraft operations. AEDT version 2d was used which allows a three-dimensional geometric model of the airfield to be constructed including the runway, flight tracks and aircraft flight profiles⁵. Aircraft noise models work by taking a core dataset of Noise-Power-Distance (NPD) source levels and then predicting the noise level emitted from the modelled aircraft.

11. In order to produce a representative MANC, station held data is required (e.g. aircraft movement figures). In accordance with JSP 418, this data must cover a period of at least 12 months. The RAF Northolt station data used to produce the MANCs was taken from 1 January 2016 – 31 December 2016. The baseline year of 2016 was chosen as it is considered a representative year of normal operations. The total number of aircraft flight movements over this period was obtained from Air Traffic Control (ATC) physical log books and broken down into Average Daily Movement (ADM) figures, based on a standardised flying year of 220 operational days (excluding weekends, bank holidays etc.) for each time domain (day, evening and night).

12. Radar data was provided to NVD by [REDACTED]⁶. This information aided the input of flight tracks into AEDT, auditing, and also allowed flight track dispersions to be applied to the model.

13. AEDT has built in aircraft flight profiles from the International Civil Aviation Organisation (ICAO), Base of Aircraft Operation version 3, and the Air Noise and Performance (ANP) databases from the European Union Aviation Safety Agency. These databases were used to model all aircraft, as opposed to using custom defined profiles. Due to the large number of different aircraft which operate out of RAF Northolt, aircraft were grouped in several categories. A representative aircraft was selected for each group and the total ADMs for that group were assigned to that aircraft.

14. General airfield data such as runway end locations and elevations were obtained from Aeronautical Information Documents Unit (AIDU) publications⁷.

⁵ Altitude, speed and engine power setting at different distances from the runway threshold.

⁶ [REDACTED]

⁷ UK MIL AIP, NORTHOLT, AD 2-EGWU-1-1, dated Oct 2017.

Results

15. The RAF Northolt MANCs are shown at Annex A. These include contours for multiple time domains and noise indices:

- L_{DEN} – 24 hour averaged noise metric with evening penalty of 5dB and night penalty of 10dB incorporated.
- $L_{Aeq,16\text{ hour}}$ without night – 16 hour averaged noise metric not including night movements.
- $L_{Aeq,16\text{ hour}}$ with night movements – 16 hour averaged noise metric including night movements to allow comparison with NVDiv historical contours.

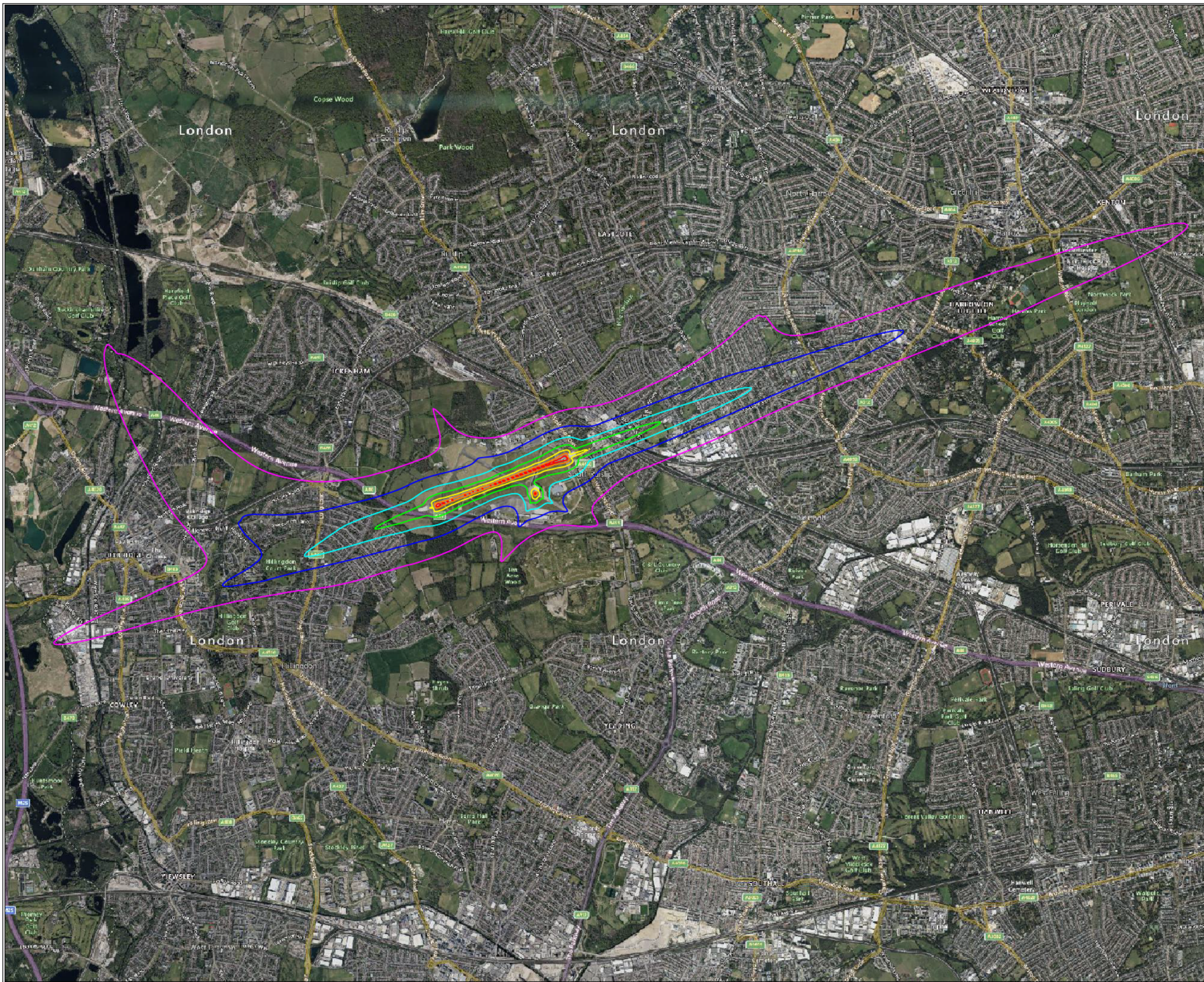
Recommendations

16. It is recommended that the combined military and civilian MANCs in Annex A are used as a basis for assessing the noise environment around RAF Northolt.

ANNEX A-1 TO
OEM/09/22
DATED
AUGUST 22

Key

- - 45dB L_{DEN} contour.
- - 50dB L_{DEN} contour.
- - 55dB L_{DEN} contour.
- - 60dB L_{DEN} contour.
- - 65dB L_{DEN} contour.
- - 70dB L_{DEN} contour.
- - 75dB L_{DEN} contour.



PROJECT
RAF Northolt MANC

TITLE
LDEN noise contours

DRAWING NUMBER
001

DRAWN BY
[Redacted]

DATE
12/07/2022

REVISION
1

CAD FILE
N/A

Technical Review:
[Redacted]

CLASSIFICATION
Public release

ANNEX A-2 TO
OEM/09/22
DATED
AUGUST 22

Key

- - 54dB $L_{Aeq,16hr}$ contour.
- - 57dB $L_{Aeq,16hr}$ contour.
- - 60dB $L_{Aeq,16hr}$ contour.
- - 63dB $L_{Aeq,16hr}$ contour.
- - 66dB $L_{Aeq,16hr}$ contour.
- - 69dB $L_{Aeq,16hr}$ contour.
- - 72dB $L_{Aeq,16hr}$ contour.

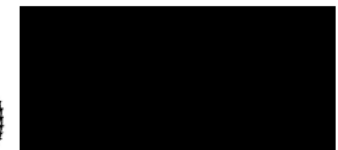


PROJECT RAF Northolt MANC	
TITLE LAeq,16hr without night noise contours	
DRAWING NUMBER OO1	DRAWN BY [REDACTED]
DATE 12/07/2022	REVISION 1
CAD FILE N/A	
Technical Review: [REDACTED]	
CLASSIFICATION Public release	

ANNEX A-3 TO
OEM/09/22
DATED
AUGUST 22

Key

- - 54dB $L_{Aeq,16hr}$ contour.
- - 57dB $L_{Aeq,16hr}$ contour.
- - 60dB $L_{Aeq,16hr}$ contour.
- - 63dB $L_{Aeq,16hr}$ contour.
- - 66dB $L_{Aeq,16hr}$ contour.
- - 69dB $L_{Aeq,16hr}$ contour.
- - 72dB $L_{Aeq,16hr}$ contour.



PROJECT RAF Northolt MANC	
TITLE LAeq,16hr with night noise contours	
DRAWING NUMBER OO1	DRAWN BY [REDACTED]
DATE 12/07/2022	REVISION 1
CAD FILE N/A	
Technical Review: [REDACTED]	
CLASSIFICATION Public release	