

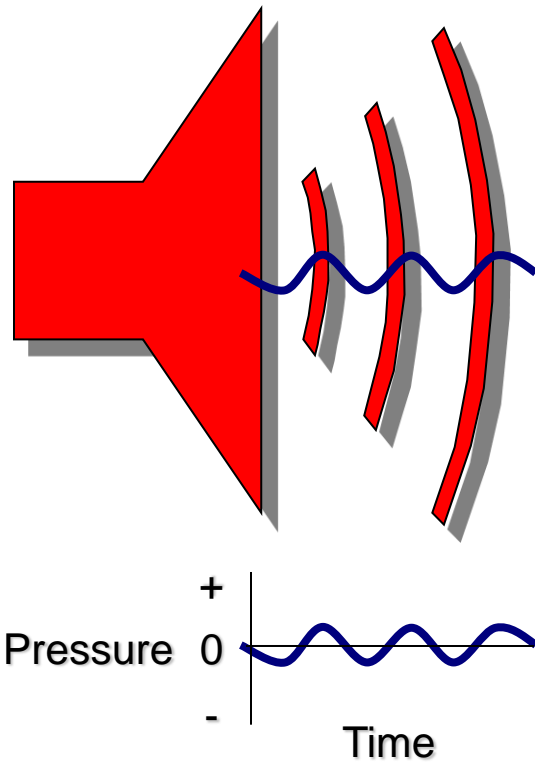
Aircraft Noise Monitoring Data from Noise Monitoring Terminals (NMTs)



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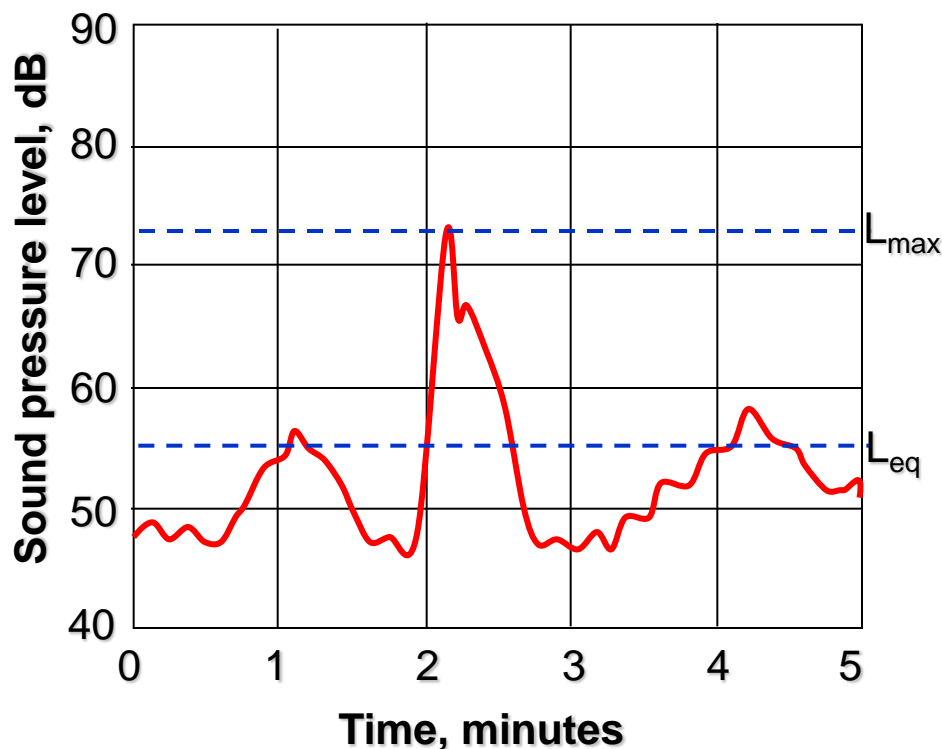
Sound



Sound is a form of energy which is transmitted through the air. In transmitting sound, the air particles vibrate, causing rapid cyclic pressure changes.

Sounds are characterised by **frequency** and **level**

Environmental Noise Descriptors



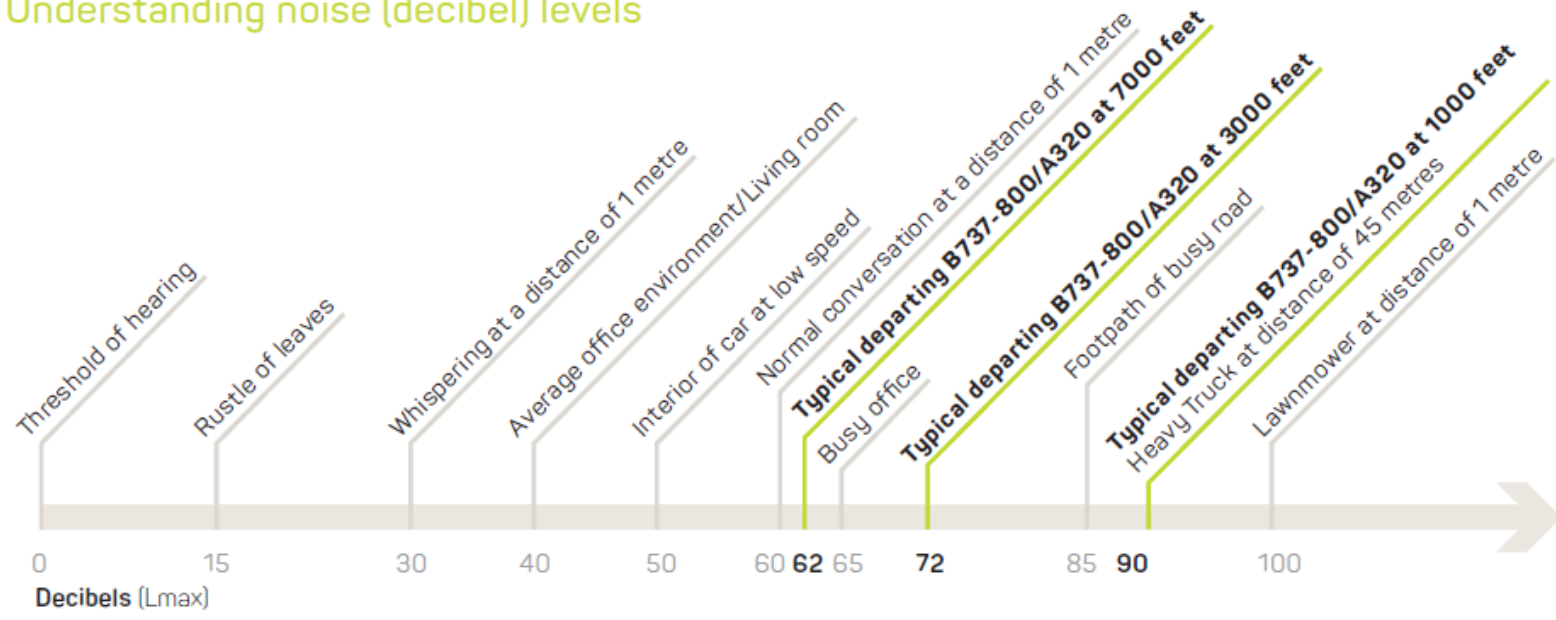
Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms.

L_{max} is the maximum instantaneous sound pressure level.

$L_{eq,T}$ is the equivalent, continuous sound pressure level.

Maximum Levels - Interpretation

Understanding noise (decibel) levels



Comparison of Metrics

L_{\max}

- Relates to individual events
- Not related to number of events

L_{eq}

- Directly related to the overall noise
- Accounts for both the magnitude of a noise event and the number of times a noise event occurs in the defined time period
- Used for research studies into community response to aircraft noise
- Used in Planning Guidance
- Used for EU Noise Mapping

The majority of studies and guidance on the assessment of noise exposure and the calculation of health impacts using exposure metrics and risk factors is based on time-averaged noise levels (such as L_{eq}) rather than maximum noise levels or numbers of high-noise events.

Why do we use Leq metric for insulation scheme

For the $L_{eq,16h}$ metric:

- 63 dB is the point where the Guidance in UK is for airport operators to offer acoustic insulation to noise-sensitive buildings, consequently it is commonly used as a threshold for noise mitigation.
- The North Runway planning conditions use 63 dB as the threshold for the voluntary noise insulation of dwellings. A scheme for all schools and registered pre-schools exposed to 60 dB is also required.
- 69 dB is where the Guidance in UK is for airport operators to offer households assistance with the costs of moving.
- The North Runway planning conditions use 69 dB as the threshold for the scheme for the voluntary purchase of dwellings.

Determining Aircraft Noise

Aircraft Noise can be measured using specialist equipment, or predicted using dedicated software which contains performance information for the aircraft.

Measurement

- Limited to selected locations
- Limited to actual activity
- Can be used to validate a noise model

Predictions

- Allow consideration of a wider area
- Allow a range of scenarios to be considered
- Used for Environmental Impact Assessment
- Used for EU mapping

Note: Predicted noise contours associated with the permitted North Runway have already been examined in detail by expert noise consultants appointed by Fingal County Council.

The Irish Aviation Authority in its role as Competent Authority in accordance with EU Regulation 598/2014, will also have further scrutiny of noise at Dublin Airport and the contours associated with the proposed changes to permitted operations.

What Role is played by Noise Monitoring Terminals in Aircraft Noise Assessments?

Aircraft Noise is monitored for a variety of reasons although the primary reason is:

- To obtain data from individual aircraft events to validate a noise model used to describe the noise around Airports.

This assists with the determination of current and future noise maps.

Supplementary uses of noise monitoring include:

- To assist in understanding the cause of a noise complaint.
- To observe differences in operational modes, such as benefits of any changes in departure or arrival procedures.
- For managing aircraft operations by informing airlines if they are operating in a manner differently from the norm.

Dublin Noise and Flight Track Monitoring System (NFTMS)

Comprises

- 9 Noise Monitoring Terminals
(6 at approx. 6.5 km Start of Roll)
- Central hub
- A feed from the radar system

Records both the overall levels of noise and also identifies aircraft events.

Start of Roll is where aircraft begins take-off run (where engines wind up)

6.5 km from Start of Roll is a location used during ICAO noise certification therefore airports use this specification for locating NMTs.

The noise monitors are set to record continuously.

The system triggers a noise event when the noise level exceeds a specific threshold level for a given length of time.

The NFTMS then automatically correlates these noise events with aircraft movement data, assigning an aircraft movement to a noise event where applicable to give a set of correlated events.

Use of a threshold is standard practice to reduce the number of non aircraft events recorded by the NFTMS.

NFTMS Monitor Locations

Main

(NMT1) Bay Lane, West of Main Runway

(NMT2) St. Doolaghs, East of Main Runway

(NMT3) Bishopswood, West of North Runway (in anticipation of construction)

(NMT4) Feltrim, East of North Runway (in anticipation of construction)

(NMT5) Balcultry, North-west of Cross Runway

(NMT6) Artane, South-east of Cross Runway

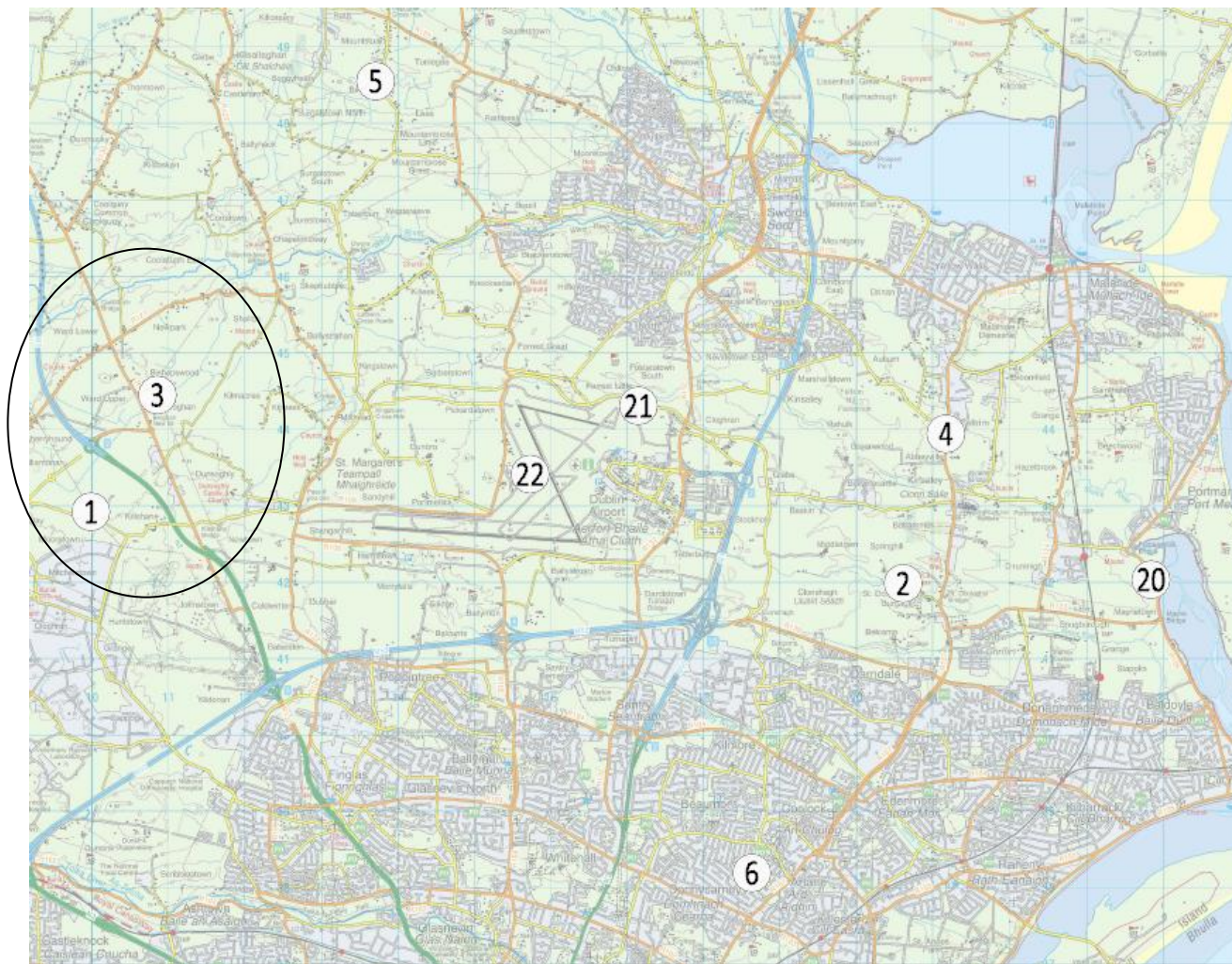
Additional

(NMT20) Coast Road, Further East of Main Runway

(NMT21) & (NMT22) Monitoring noise produced by aircraft on the ground at a location close to the airport

N.B. Numbering not sequential so there is no NMT7 to NMT19.

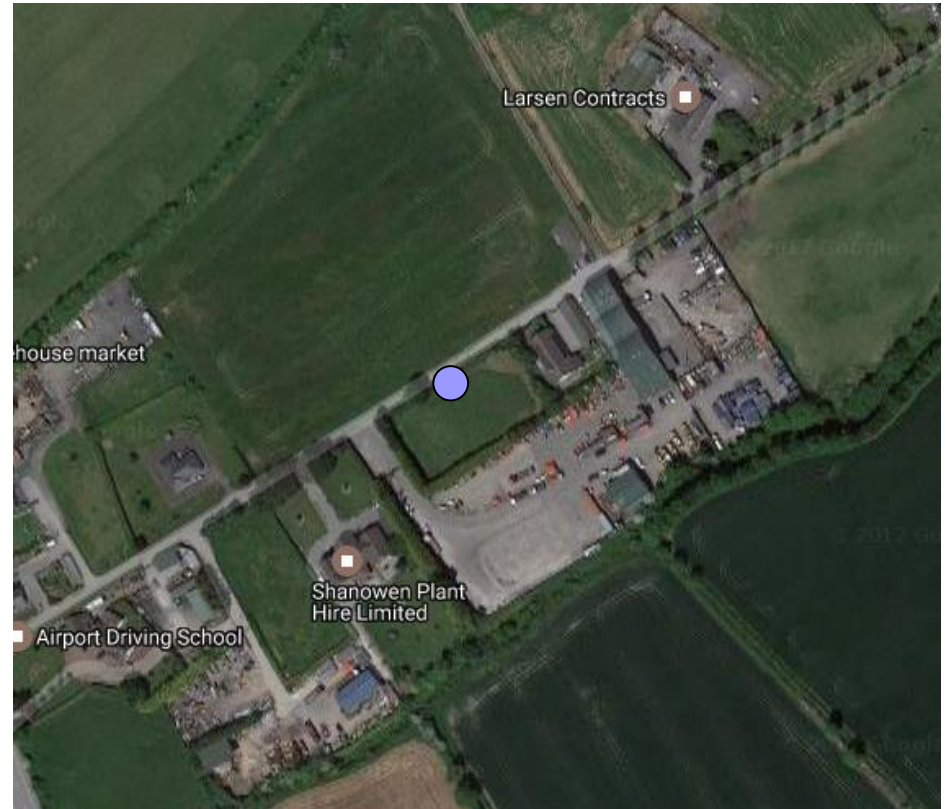
NFTMS Monitor Locations Cont:



NFTMS NMT1 Bay Lane – Details



NFTMS NMT3 Bishopswood – Details



NFTMS Maximum Noise Levels

January to June 2016 - Arrivals

NMT	Monthly Average* Maximum Noise Level, L_{max} dB					
	January	February	March	April	May	June
1	80	80	80	80	80	79

January to June 2016 - Departures

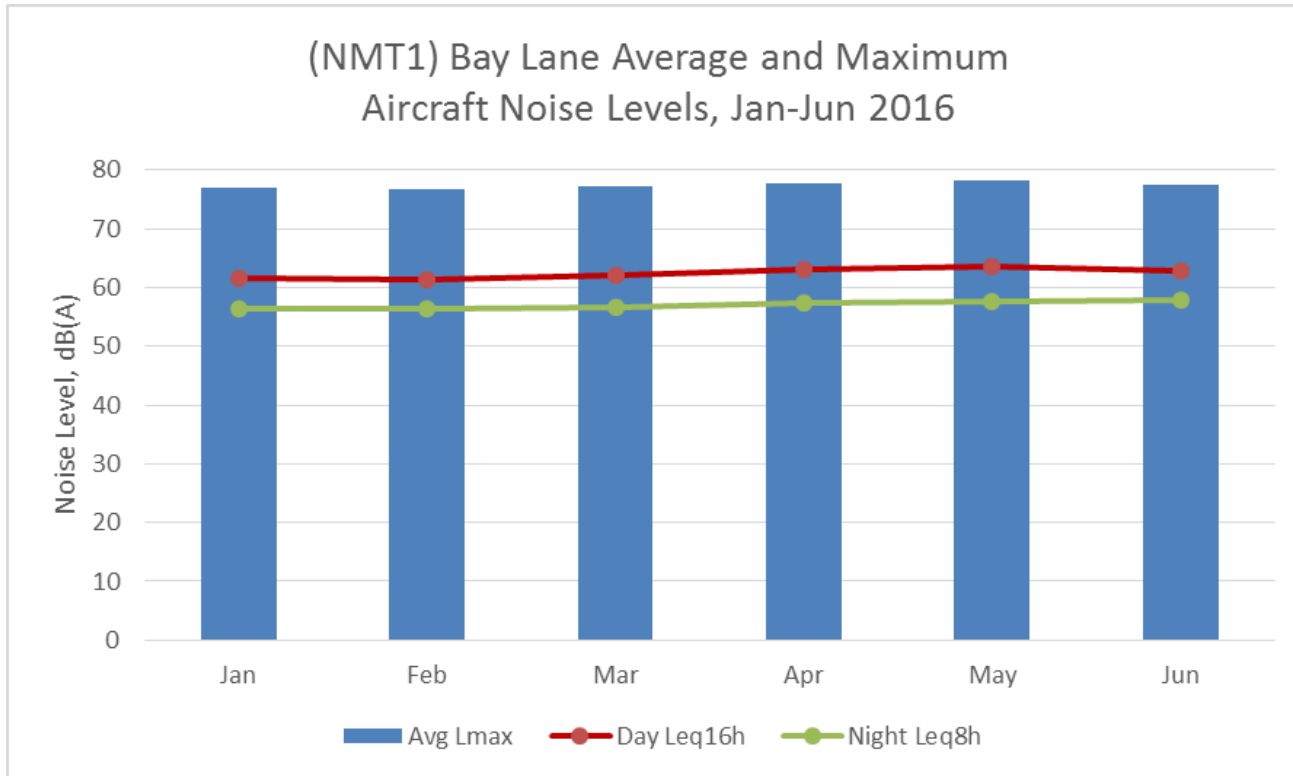
NMT	Monthly Average* Maximum Noise Level, L_{max} dB					
	January	February	March	April	May	June
1	76	76	76	76	76	76

* Average of the maximum levels of all arriving or departing aircraft events recorded at the NMT in the month.

- On a monthly basis the noise levels from arrivals and departures at NMT1 are consistent.
- At NMT1 arriving aircraft produce higher maximum noise levels than departures.

Note: Table reflects individual events. Planning conditions for North Runway and available Guidance (from UK) is to use L_{eq} when assessing noise impact for the purposes of sound insulation schemes as the L_{eq} reflects both the individual events and frequency of those events.

NFTMS Average & Maximum Noise Levels



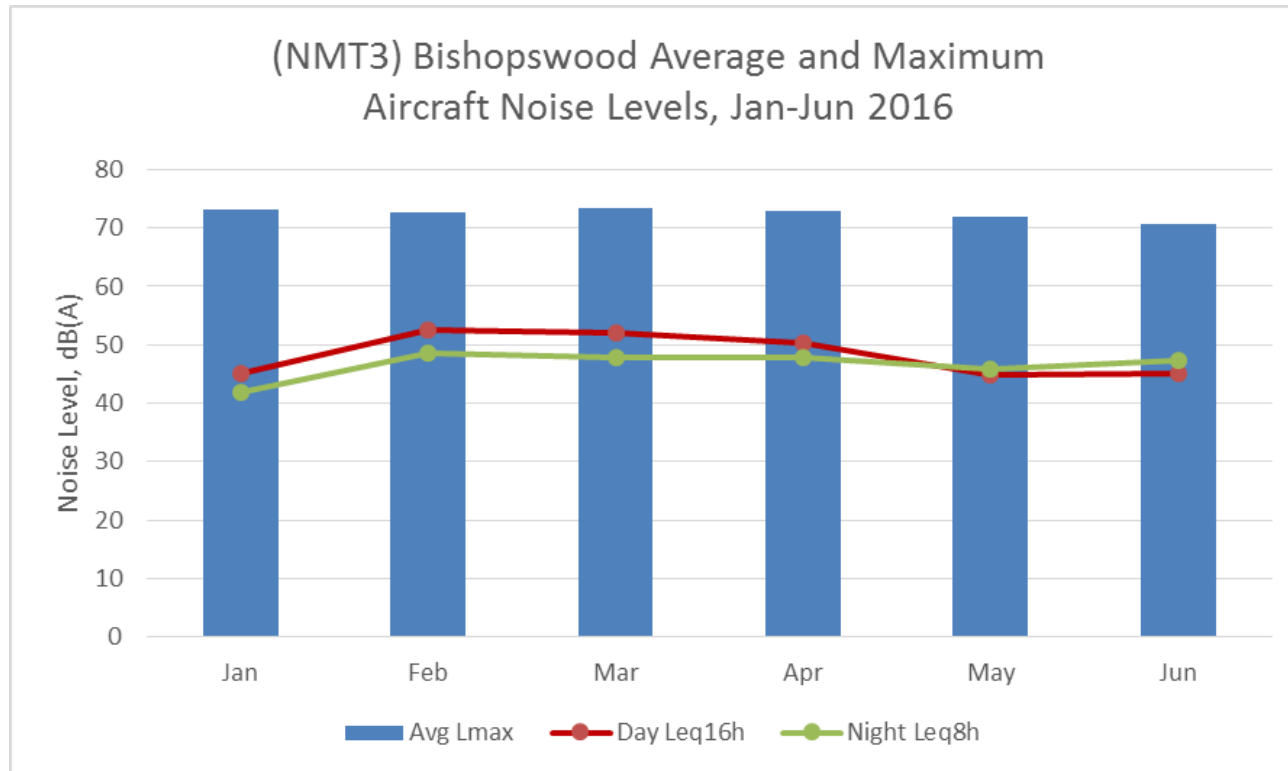
Average L_{eq} for 6-month period
Day 62.5 dB
Night 57.1 dB

Based on 42,566 aircraft noise events

Avg L_{max} is the average of the maximum levels of all aircraft events recorded at the NMT in the month.

Average L_{max} for 6-month period is 77 dB
 Day L_{eq} 5 dB higher than night on average

NFTMS Average & Maximum Noise Levels



Average L_{eq} for 6-month period

Day 49.6 dB

Night 47.0 dB

Based on 4,122 aircraft noise events

Avg L_{max} is the average of the maximum levels of all aircraft events recorded at the NMT in the month.

Average L_{max} for 6-month period is 72 dB

Day L_{eq} 3 dB higher than night on average

Relatively few aircraft overfly this monitor currently



Summary

- NMT 1 is positioned to record westerly departures and easterly arrivals from the existing main runway. Results are consistent and show the average maximum noise levels of aircraft to be 80 dB on arrival and 76 dB on departure.
- NMT 3 is positioned to record westerly departures and easterly arrivals from the permitted North Runway. As a result very few aircraft are recorded currently relative to the level of operation as most aircraft do not fly close to this monitor.