Aircraft Noise

New Zealand Standard NZS 6805:1992 Airport Noise Management and Land Use Planning provides guidance to territorial authorities on implementing appropriate land use controls and noise rules to manage the effects of aircraft noise.

The scope of NZS 6805 includes establishing *"maximum acceptable levels of aircraft noise exposure around airports for the protection of community health and amenity values whilst recognising the need to operate an airport efficiently"*.

NZS 6805 recommends two aircraft noise boundaries in the District Plan based on future operations:

- Airnoise Boundary 65 dB Ldn New noise sensitive activities prohibited
- Outer Control Boundary 55 dB Ldn New noise sensitive activities prohibited or subject to acoustic insulation

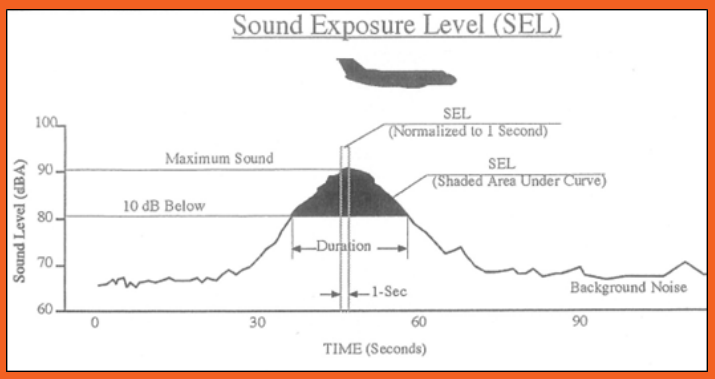
Aircraft noise shall not exceed 65 dB Ldn at the Airnoise Boundary

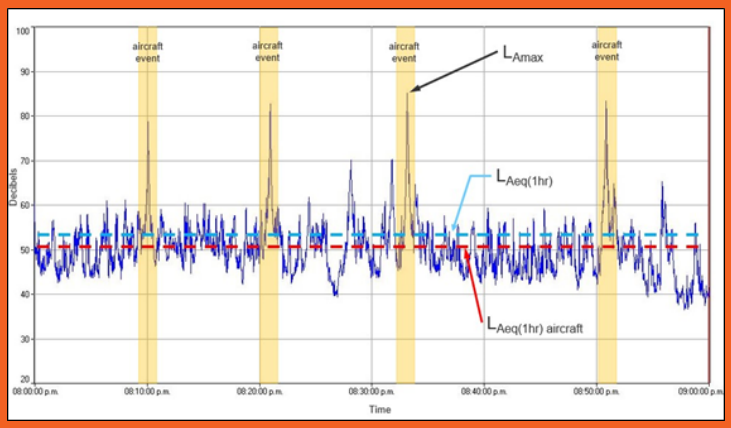
How We Measure Aircraft Noise

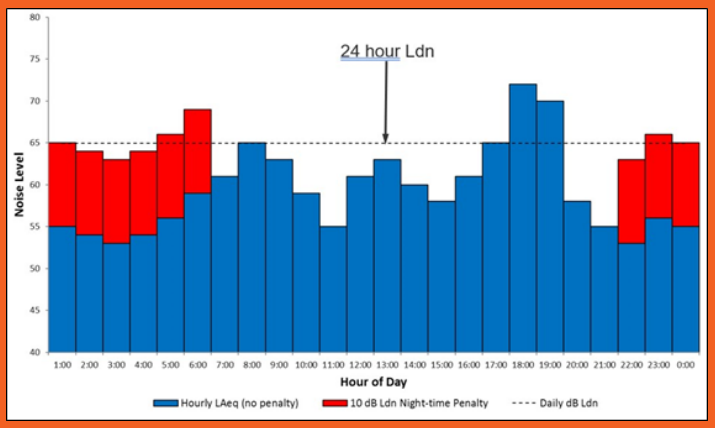
NZS 6805 defines aircraft noise boundaries using the Ldn noise metric. Ldn is a measure of noise exposure and uses the cumulative 'noise energy' received from all aircraft events over 24 hours with a 10 decibel weighting applied to night flights.

The noise from each aircraft event is measured using the Sound Exposure Level (SEL or L_{AE}). SEL is the total sound energy from a noise event normalised to a one second duration.

Ldn is calculated using the SEL of all aircraft events over 24 hours. The 10 dB weighting is added to SELs of events between 10pm and 7am. Then all aircraft event SELs are summed and averaged over 24 hours







This shows an example of one hour of noise data measured every second. The data is used to calculate SELs and hourly average levels (LAeq) which are then used to calculate Ldn. Aircraft noise fluctuates due to being short duration events separated by periods of quiet. Also, peak hours of the day are noisier than others. The Ldn metric measures the 24-hour exposure to aircraft noise.

Aircraft Noise Modelling

NZS 6805 recommends the Integrated Noise Model (INM) software is used to calculate Ldn contours. INM has been replaced by the AEDT software. The AEDT contains a database of noise and flight performance data for hundreds of commercial, general aviation and military aircraft types.

We input the following information to calculate noise contours:

- Location of runways
- Location of flight tracks
- Aircraft movements for the average day (3month average)
  (aircraft type, arrival/departure, time of day, runway, flight track, stage length, flight profile)
- Aircraft ground operations such as taxiing.

The AEDT calculates Ldn noise contours for the average day. The average day is determined over 3 months which takes account of the variation in wind direction and fluctuation of operations.

How Loud is That?

Change in Sound Level (dBA)	Subjective Reaction
1 - 2	Imperceptible change
3 - 4	Just perceptible change
5 - 7	Appreciable change
9 - 11	Doubling of loudness
> 12	More than a doubling