How you can use this information

If you are living near a major airport or you are thinking of moving close to one you, might:

- use this information to compare a house you are thinking of moving into, that is near an airport, with one in a quieter area. Noise maps are publicly available for most major airports (www.airservices.gov.au).
- think about improving the noise insulation of your house to reduce indoor noise. A building advice leaflet called 'Reducing Aircraft Noise in Existing Homes' has been produced for this purpose and can be obtained from the Perth Airport.
- want to get more information about aircraft noise. A useful brochure called 'Aircraft Noise Information' has been produced by the Perth Airport.
- use this information to consider your attitude to aircraft noise – a tolerant or positive attitude can help people living close to an airport deal better with any noise effects.

Further reading on the effects of noise

For more information on the effects of noise on people:

- 'Aircraft Noise Information' brochure, June 2005, Perth Airport, **www.perthairport.com**
- 'The Health Effects of Environmental Noise – Other Than Hearing Loss', May 2004, enHealth Council, Commonwealth of Australia, **www.health.gov.au**
- 'Community Noise', 1995, World Health Organisation, **www.who.int**
- Health Canada – Aircraft Noise website, **www.hc-sc.gc.ca**

Disclaimer

While all reasonable care has been taken in compiling the information contained in this brochure, the authors accept no responsibility or liability for any consequences arising from its application. The authors recommend that independent expert advice, applicable to a person's individual circumstances, is always obtained.

In addition, it is expected that people reading this information will keep themselves appraised of issues which may influence their assessment of where they live and/or improving the environment in which they live and will rely on their own enquiries.

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Aircraft images courtesy of Perth Airport.

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Aircraft noise and its effects

Thinking of living near a major airport?
Wondering how aircraft noise might affect you?

This is an information leaflet to help you understand:

- **how we react to noise; and**
- **the ways aircraft noise may affect people.**

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Environment and Conservation**

Department of **Health**

What is noise?

People are complex creatures. We all react to sounds in different ways. Some sounds we may find pleasant, while others may bother us. We call the sounds we don't like "noise".

There are many reasons why some people find the sound of aircraft annoying while others do not. They include:

Our attitude to the source of noise – some people have a passion for aircraft, while others view them simply as a nuisance.

Our activity at the time – aircraft noise may be more disturbing at night when we are trying to sleep than during the day when we are active.

How much we can 'control' the sound – a sound is less likely to annoy us if we can stop it or reduce it (for example by closing windows).

The 'messages' in the sound – for example, we will be more likely to pay attention to an aircraft that sounds as though it is flying at a low altitude.

The loudness and duration of the sound – we are more likely to be annoyed by louder sounds than by quiet ones, and by sounds that occur more often and last longer.

How do our senses deal with noise?

Our ears pick up sounds and feed the signals to the brain. The brain releases hormones in response to the noise. The main hormone responses are:

- **Adrenaline and noradrenaline** – These hormones trigger our 'fight or flight' response to sudden noise. They raise our heart rate and boost our muscle strength to ready us for action. These hormones act quickly but tend to last for only a short time. For instance, when a car backfires nearby we may briefly feel angry or nervous.
- **Cortisol** – Long-term exposure to noise, especially those noises that are out of our control, can induce stress and raise cortisol levels. This hormone is our body's response to more severe or prolonged stress. It helps us to resist this stress by changing our body's energy use and readying us for survival. However, stress and thus high levels of cortisol, over a long period, can impact on body functions.

Most of the time our minds can override our natural hormonal response and the noise will not be a bother. Sometimes our reactions cannot be easily controlled and the noise becomes a problem.

Studying how communities react to noise

- Research workers have studied the effects of aircraft noise on people for some years now and their methods are well developed.
- Noise studies are usually done by surveys and testing of large numbers of people to try to isolate the effect on the community due to noise alone.
- No single study gives a full picture of the effects of noise – but when these studies are taken together, a clearer picture emerges.

In reading 'What the research tells us about aircraft noise' below, be aware that:

- The comments are based on reviews of the best Australian and overseas studies that have been done on this topic;
- It gives a good idea how a community may react to noise, but does not show how any one person (you) may react;
- These comments are not meant to alarm you, but to help you to weigh up the benefits of living near an airport against the impacts of noise.

What the research tells us about aircraft noise

Annoyance and disturbance

The noise from aircraft at a major airport tends to come and go as the planes fly over. This may disturb normal household activities such as reading and watching TV, and may bother us when we are chatting with friends – such as when we are outdoors around the barbecue. Annoyance is greater at night than during the day and rises with the noise level and number of flights.

These factors were taken into account in developing the Australian Noise Exposure Forecast (ANEF) system for Australian Airports. The ANEF system is one way of estimating community reaction to aircraft noise. The system displays noise exposure contours around each airport based on the types and number of aircraft movements, their distribution over the day and night time periods, and each aircraft's particular noise characteristics. The higher the ANEF contour level the greater the chance that people in these areas will be annoyed by noise. The study used as the basis for the ANEF system found that, at a level of 25 ANEF, more than half the people were affected by aircraft noise, with some 18 per cent of the people 'seriously affected'. Some people will also be annoyed by noise at ANEF levels below those shown on airport noise maps.

For more information on ANEF contours and other noise maps, refer to Perth Airport's 'Aircraft Noise Information' brochure.

Sleep disturbance

Noisy events like aircraft flying over can wake us up or stop us from falling asleep, especially when they stand out from other normal noise. The number of times a person may be woken from sleep due to aircraft noise can be estimated from a formula based on several overseas studies. This formula suggests that, in the suburbs closest to Perth Airport for example, an average person might be woken about once or twice a week. Of course, this will vary from one person to another.

Many people think they will 'get used to' noise at night. However, even though a noisy event may not wake us, it may well change our 'sleep state' and thus lower our quality of sleep without us being aware. Our sleep quality may affect our mood and performance the next day. According to the National Environmental Health Council (enHealth Council) there is the suggestion that regular disturbed sleep can lead to more serious health problems.

Children's learning

Noise can sometimes stir us to perform better on simple tasks. However, the body of research shows that, over time, aircraft noise can result in children not doing as well on difficult tasks – like reading, listening, problem solving and memory – when compared with children at schools in quiet areas. A reason for this is thought to be that prolonged noise exposure can raise the levels of cortisol. This can have significant effects on body functions and may explain poorer performance in children.

A major German study showed that children's performance improved some 1–2 years after the noise exposure stopped, so these effects may be reversible.

Medical conditions

Blood pressure – Many different factors affect blood pressure and it is difficult to determine if people are likely to suffer from high blood pressure because of noise alone. Researchers suspect there is a link between noise and blood pressure, however the studies do not demonstrate this consistently. Some studies show a higher risk due to noise while others do not.

Heart disease – Overall, the studies show that noise may be a risk factor for heart disease for those living in high noise areas (roughly the 30 ANEF noise contour or higher), although the size of the effect is likely to be small. This means people living close to major airports for long periods need to be aware that they may be at a slightly higher risk of heart disease because of the noise.

Mental illness – There is no strong evidence that noise causes mental illness. However, those with existing mental health problems, usually either depression or anxiety, are more likely to be disturbed by aircraft noise than the general population.

Other effects – Noise may reduce the effectiveness of the immune system and there is some limited evidence that it may cause lower birth weight in babies.

Higher-risk groups

Some groups of people may be at a greater risk of the above problems impacting on their lives. These include the elderly, children and people with heightened sensitivity to noise.