

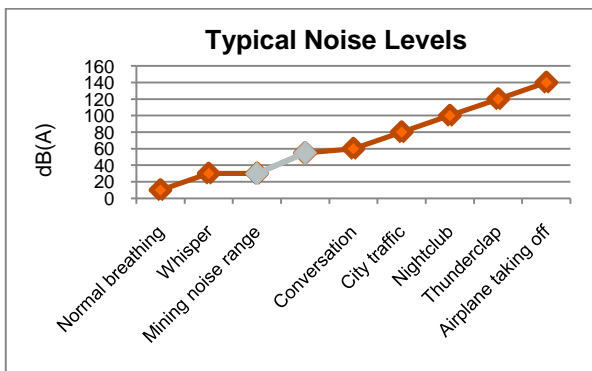


## Environmental Noise and the NSW Minerals Industry

*Noise* is part of everyday life. Mining operations generate *noise* that may be audible to the surrounding community. This fact sheet explains what may be experienced, how these activities are regulated and how they can be managed.

### What is noise?

*Noise* consists of sounds that travel through the air as a series of waves. Different sounds have different characteristics which change based on their *amplitude* (loudness) and *frequency* (pitch). We are able to distinguish between sources of *noise* by the character of the *noise*, and by the level a *noise* exceeds the *ambient* (background) level. The figure below shows a range of *noise* levels that we may experience in everyday life.



Our hearing is able to sense the general direction of a *noise* and whether the *sound* has low or high *frequencies*. *Noise* can have characteristics that lead it to becoming annoying and intrusive, such as the presence of a tonal, impulsive or undulating character.

### Where does noise from mining operations come from?

Mining operations are complex sites involving many different activities that each produce different types of *noise*. The *noise* characteristics from a site will vary at different times of the day based on the type and location of the mining operation.

Mining operations typically involve a transport fleet, which can include dump-trucks and large earth moving equipment, road and rail activity, draglines, blasting, conveyors, crushing, screening and process plants.

Mining typically operates 24 hours a day, seven days a week. There are also other *noise* sources in the communities that we live with eg. other industries, roads, railway, domestic activities and local fauna. The issue for the community is what an acceptable level of *noise* is when all of these *noise* sources are accounted for and how community amenity is affected.

### How is noise measured?

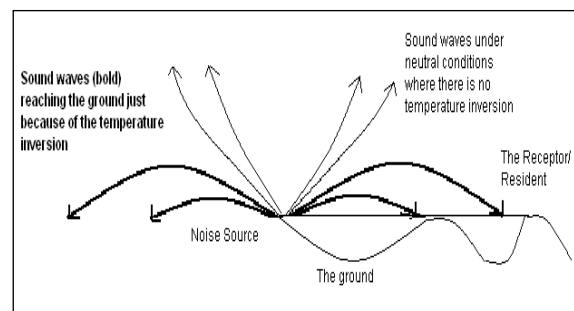
*Sound Level Meters* measure the change in pressure associated with the sound waves and with regard to a *frequency* range. This measurement of *noise* then has an *A-weighting* adjustment applied to simulate the response of the human ear. *Noise* has been measured for many years and is a well understood science. Environmental noise measurement in the field is complex and specialist training is required.

### Can weather affect noise?

Yes, because *noise* travels through the atmosphere (air), meteorological conditions can increase the level of *noise*. Temperature, wind speed and direction, humidity and cloud cover affect the level of the *noise*.

Temperature inversions can potentially increase the impacts of *noise*. There is a greater chance of hearing *sound* from a distant source when there is a temperature inversion. Temperature inversions occur at different heights above the earth's surface and reflect *sound* waves back to ground due to a layer of warm air sitting above the cold air closer to the ground.

The impact of a temperature inversion on *sound* waves is illustrated in the following diagram. Distant traffic, rail lines and *noise* sources which are not usually audible become louder. Wind in the direction from a source to a residential area will also increase the level of *noise*. The impact of wind is more significant at low wind speeds. These factors are described as *noise* enhancing and need to be considered when managing *noise* for a mining operation.



### Is noise regulated by government?

Yes, impacts from *noise* on communities have been widely researched to minimise direct or long-term effects. Consequently, governments have introduced policies and regulations to manage *noise*. This balances the need of our society's industrial activity with the need to mitigate *noise* impacts on the community. These regulations allow industry and planning authorities to assess the likely *noise* impacts of new activities and

minimise cumulative impacts in the community. Relevant documentation includes:

- *Environmental Criteria for Road Traffic Noise*, administered by Department of Environment, Climate Change & Water (DECCW)
- *Environmental Planning and Assessment Act 1979*, administered by Department of Planning (DoP)
- *Industrial Noise Policy (INP)*, administered by DECCW
- *Mining Act 1992*, administered by Industry & Investment NSW (I&I NSW)
- *Protection of the Environment Operations Act 1997*, administered by DECCW.

Mine sites can also be required to have control strategies for operational *noise* in their Mining Operations Plan (MOP) and report on environmental performance annually to I&I NSW within the Annual Environmental Management Report (AEMR) as required under the Mining Act 1992 and to DECCW under their Environment Protection Licence.

### How do we arrive at a satisfactory level of noise from a mining operation?

For new projects, project specific *noise* limits using the methods outlined in DECCW's Industrial Noise Policy (INP) are used to determine acceptable levels of *noise* which can be generated from a development. The level of operational *noise* from a mine takes into account specific factors to protect the amenity of the community. Future mining operations are able to predict the likely levels of *noise* with reliable accuracy. *Noise* limits can typically be viewed in DECCW's Environment Protection Licence and DoP's Notice of Determination (conditions of consent) for a mining operation.

*Noise* prediction models are used to calculate the potential level of *noise* from a mine site. This enables appropriate management practices to be in place to minimise *noise* impacts on the community. These models use the terrain effects, the weather conditions and a large number of *noise* sources to predict the potential level of *noise* from an operation on surrounding residential locations and at the operation's boundaries.

*Noise* limits vary amongst mine sites. Typical limits can vary between 30 – 55dB(A). These will vary depending on the location of the operation, existing background levels, type of receptor, time of day and day of the week. *Noise* levels below approved limits are often audible to the community.

### How does the mining industry manage noise?

Mine operators mitigate *noise* by selecting best practice procedures that minimise *noise* levels on surrounding communities. By understanding the potential *noise* impacts of an operation, selected practices can be applied to address specific issues. Typical methods of *noise* management are documented in *Noise* Management Plans and include:

- Plant and equipment design and selection
- House crushing and screening plant within buildings
- Avoiding low frequency *noise* emissions using acoustic silencers on noisy equipment
- Enclosing conveyor systems
- Reducing impact *noise* by lining chutes with hard wearing rubber and polyurethane materials
- Using terrain to acoustically shield the operations

- Placing noisy equipment behind noise barriers
- Operational procedures such as speed limits on roads on site
- Alternate safety systems on mobile equipment to replace reversing alarms and horns
- Monitoring systems to reduce the impact of weather conditions
- Replacing older equipment with new technology that is often quieter.

Regular monitoring also occurs.

### Consultation with the community

Mine operators work with stakeholders to ensure the amenity of the community is recognised and taken into account by the mining operation.

### Glossary of Terms

**Ambient Level:** the background level free of the noise emissions from the operations being assessed.

**Amplitude:** the height of a sound wave.

**A-weighting (dB(A)):** an adjustment made to sound level measurement to better approximate the response of the human ear.

**Decibel (dB):** a unit of sound measurement which quantifies pressure fluctuations associated with noise and overpressure.

**Frequency:** the number of waves per second. A wave with a low frequency has a greater distance between waves compared with a high frequency wave.

**Noise:** the combined level of sound that we hear in everyday life from numerous sources.

**Sound:** any pressure variation that the ear can detect; a series of waves that travel through the air.

**Sound Level Meter:** an instrument that measures sound pressure levels in decibels.

### References and more information:

- DECCW, *Environmental Criteria for Road Traffic Noise*: [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)
- DECCW, Environment Protection Licence: [www.environment.nsw.gov.au/licensing/index.htm](http://www.environment.nsw.gov.au/licensing/index.htm)
- DECCW, *Industrial Noise Policy (INP)*: [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)
- Department of Planning: [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au)
- *Protection of the Environment Operations Act (POEO Act)*: [www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au)

*Disclaimer:* This fact sheet is intended to provide summary information only. It does not intend to be comprehensive or to provide specific legal advice. Given the changing nature of legislation, regulations, program rules and guidelines, there is a potential for inherent inaccuracies and potential omissions in information contained in this fact sheet. All information in this fact sheet is provided "as is" with no guarantee of completeness or accuracy and without warranty of any kind, express or implied. In no event will New South Wales Minerals Council Limited, any related members, consultants or employees thereof information be liable to anyone for any decision made or action taken in reliance on the in this paper or for any consequential damages.