Glossary of terms

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[σθ] sigma-theta: the standard deviation of horizontal wind fluctuation.	**A1 Horizon:** the upper most layer of a soil generally referred to as topsoil. It has a high content of organic matter relative to other horizons, a dark colour and maximum biological activity.
Aboriginal cultural heritage: objects and places that are significant to Indigenous people under Aboriginal or Torres Strait Islander tradition.	**Aboriginal objects:** deposits, objects or material evidence relating to Aboriginal habitation of New South Wales and include Aboriginal remains.
Aboriginal place: a place which is or was of special significance for Aboriginal people, and which is also recognised as 'significant' by the Minister. In other words the Minister needs to be convinced that a place should be declared an Aboriginal place.	**Acid mine drainage:** acid leachate lowing from the overburden caused by oxidisation of pyritic materials to form sulphuric acid.
Acid sulphate soils: when exposed to air after being disturbed, soils containing iron sulfides produce sulfuric acid and often release toxic quantities of iron, aluminium and heavy metals.	**Aeolian:** wind generated geologic processes.
Alluvial: relating to, composed of, or found in alluvium.	**Alluvium:** sediment deposited by a flowing stream, consisting of unconsolidated material including gravel, clay, silt, and sand.
Ambient air quality: the condition of the air in the surrounding environment.	**Ambient sound**: the totally encompassing sound in a given situation at a given time usually composed of sound from all sources near and far.
Amenity criteria: the amenity criteria relate to existing industrial noise. Where industrial noise approaches base amenity criteria, then noise levels from new industries need to demonstrate that they will not be an additional contributor to existing industrial noise.	**Apedal:** a soil in which little or none of the material occurs in peds or aggregated in the moist state. Apedal soils are without apparent structure and are typically massive or single grained.
Aquifer: a porous soil or geological formation, often lying between impermeable subsurface strata, which holds water and through which water can percolate slowly over long distances to groundwater springs and wells.	**Atmospheric dispersion modelling:** the mathematical simulation of how air pollutants disperse in the ambient atmosphere. The dispersion models are used to estimate or to predict the downwind concentration of air pollutants emitted from sources such as industrial plants and vehicular traffic.
Atmospheric stability class: the amount of atmospheric turbulence present at a location is categorised into six classes [A to F] with class A being the most unstable or most turbulent class, and class F the most stable or least turbulent class. σ_θ is used to approximate stability class.	**Basal:** relating to, situated at, or forming the base.
Base line: studies conducted to establish prevailing environmental conditions.	**Baseflow:** groundwater seepage into a stream channel.
Beneficiated dewatered tailings: black moist coal cake derived from waste products generated by coal washeries.	**Benefit Cost Analysis:** an analysis of the cost effectiveness of different alternatives in order to see whether the benefits outweigh the costs. The costs and benefits of the impacts of an intervention are evaluated in terms of the public's willingness to pay for them [benefits] or willingness to pay to avoid them [costs].
Biodiversity: the variation of life forms within a given ecosystem, biome, or for the entire Earth.	**Bituminous coal:** a type of coal with a high percentage of volatile matter that burns with a smoky yellow flame.

Box-cut: a relatively narrow but deep excavation with steep faces on three sides usually sunk to allow access to underground workings or as the initial excavation in open cut mines.	**Bunded [bunding]:** the area within a structure designed to prevent inundation or breaches of various types.
Catchment area: the area from which a river or stream receives its water.	**Cation:** ion with a positive charge.
Choice modelling: attempts to model the decision process of an individual or segment in a particular context. Choice modelling may also be used to estimate non-market environmental benefits and costs.	**Coal reserves:** those parts of the coal resources that are planned to be mined.
Coal resources: all of the potential useable coal in a defined area identified by geological data.	**Coarse rejects:** solid material from a coal washery consisting of coarse and fine rock fragments such as carbonaceous shales and up to 30% carbon.
Coking coals: low volatile hard coking coal and low ash semi-soft coking coal is used for iron and steel production.	**Community:** a group of interacting organisms sharing an environment.
Contrast: the degree to which a development component differs visually from its landscape setting.	**Controlled action:** a proposed action that is likely to have a significant impact on: a matter of national environmental significance; the environment of Commonwealth land [even if taken outside Commonwealth land]; or the environment anywhere in the world [if the action is undertaken by the Commonwealth].
Cumulative: increasing by successive additions.	**Daytime:** for the purposes of industrial noise assessment DECCW defines daytime as the period between 7am and 10pm**.**
dB[A]: the decibel scale can have a number of weighting scales applied to it, the most common being the A weighting filter. The purpose of the filter is to apply weighting adjustments over the frequency range of human hearing so that measured levels better match perceived levels. The [A] denotes the use of this filter. The following points give an indication of what the noise levels and differences represent in terms of perception, to an average person: 0dB represents the threshold of human hearing [for a young person with ears in good condition], 140dB represents the threshold of pain, Noise level differences of less than 2dB are generally imperceptible, Differences of around 5dB are usually significant, and an increase or decrease of around 10dB appears to double or halve the loudness of a noise.	**dB:** a unit of relative noise level. Audible sound pressure varies across a range of 107 Pa from the threshold of hearing [20µPa] to the threshold of pain [200Pa]. In order to express noise with more manageable numbers, a logarithmic scale called decibels is used.
Demographics: the characteristics of a population as used in government, marketing or opinion research, or the demographic profiles used in such research. Commonly-used demographics include sex, race, age, income, disabilities, mobility [in terms of travel time to work or number of vehicles available], educational attainment, home ownership, employment status, and even location.	**Dewatering:** the removal of water from solid material or soil by wet classification, centrifugation, filtration, or similar solid-liquid separation processes, such as removal of residual liquid from a filter cake by a filter press as part of various industrial processes.
Dip: the direction in which the rock strata is inclined.	**Discount rate:** the rate of interest used to discount a stream of future payments to arrive at their present value.

Dispersible soils: sodic soils in which the clay fraction forms a suspension on wetting. Often leading to severe tunnelling and gully erosion.	**Diurnal:** active chiefly in the daytime [diurnal animals].
Drawdown: a lowering of a reservoir or a change in hydraulic head in an aquifer.	**Duplex soils:** a soil in which there is a sharp change in texture between the A and B horizons.
Duplex: a soil in which there is a sharp change in texture between the A and B horizons.	**Ecologically sustainable development:** using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.
Electrical conductivity: a measure of a material's ability to conduct an electric current, and used to estimate one salinity in water.	**Ecological value:** the values that each species has as part of an ecosystem.
Emplacement: a stockpit of spoil or overburden transported and dumped away from the excavation of an open cut mine.	**Engagement:** an organisation's efforts to understand and involve stakeholders and their concerns in its activities and decision-making processes.
Endangered population: a population specified in Part 2 of Schedule 1, *Threatened Species Conservation Act 1995 NSW*.	**Externalities:** costs or benefits of production or consumption experienced by society but not by the producers or consumers themselves. Sometimes referred to as 'spillover' or 'third-party' costs or benefits.
Ephemeral [Waterbody]: a wetland, spring, stream, river, pond or lake that only exists for a short period following precipitation or snowmelt.	**Field of view:** this area includes the total view, consisting of the primary view zones above and the secondary or peripheral view zones around the primary view zone, out to about 70^0 either side of the central view line in both vertical and horizontal plain.
Fault [**fault line]:** a planar fracture in rock in which the rock on one side of the fracture has moved with respect to the rock on the other side. Large faults within the Earth's crust are the result of differential or shear motion and active fault zones are the causal locations of most earthquakes.	**Flocculation:** the process by which destabilised colloidal or very fine clay particles, suspended in water come together into larger masses which eventually settle out of suspension. Flocculation depends on the balance between exchangeable ions on the clay and those in solution, as well as the overall ionic strength of the solution.
Fine rejects: fine residual waste material separated in the coal preparation process.	**Full time equivalent:** ratio of total number of paid hours during a period [part time, full time, contracted] by the number of working hours in that period Mondays through Fridays.
Fugitive emissions: emissions of gases or vapors from pressurized equipment due to leaks and various other unintended or irregular releases of gases, mostly from industrial activities.	**Groundwater:** subsurface water which is within the saturated zone and can supply wells and springs. The upper surface of this saturated zone is called the water table.
Green offset: a green offset is a way that the negative impact on vegetation or vegetation communities at one site can be offset by positive actions at another site. The person[s] causing the impact can either take the action themselves or pay for others to do it on their behalf.	**Heavy vehicles:** rigid trucks, buses, semitrailers, etc.
Habitat: the environment in which a plant or animal lives, and often described in terms of their geography, climate and vegetation.	**Highwall:** the unexcavated face of exposed overburden and coal or ore in an open pit mine or the face or bank of the uphill side of a contour strip-mine excavation.

High volume air sampler: uses a continuous duty blower to suck in an air stream. The particle size classifier separates particles greater than 10µm size from the air stream. The air stream is then passed through a filter paper to collect particles lesser than 10µm size. Gravimetric measurements yield values of suspended particulate matter, as the sum of the two fractions, and PM10, the material retained on the filter paper.	**Hydraulic gradient:** the slope of the water table or aquifer. The hydraulic gradient influences the direction and rate of groundwater flow.
Hydraulic conductivity: a property of vascular plants, soil or rock that describes the ease with which water can move through pore spaces or fractures. It depends on the intrinsic permeability of the material and on the degree of saturation.	**Hydrogeologic:** the relation of hydrological phenomena to the surface geology.
Hydrogeological units: rock bodies with more or less uniform hydraulic properties. These units are defined based on lithostratigraphy, primary lithology and associated hydraulic properties and stratigraphic position. A hydrogeological model is simply defined as a spatial interpretation of the subsurface into hydrogeological units.	**Hydrogeologist:** a person who studies the ways that groundwater moves through the soil and rock of the earth.
Hydrology: science that relates to the properties, distribution and circulation of the Earth's water.	**Incremental cost:** the increase or decrease in costs as a result of one more or one less unit of output.
Indigenous: native to, or originating in, a particular region or country.	**In-migration:** coming in from another region of the same country.
Input-output analysis: this involves dividing the economy into sectors where each sector is a user of inputs from and a supplier of outputs to other sectors. The technique examines how these inputs and outputs can be matched to the total resources available in the economy.	**Insoluble solids:** a solid that does not dissolve in water.
Integration: the degree to which a development component can be blended into the existing landscape without necessarily being screened from view.	**Interburden:** material of any nature that lies between two or more bedded ore zones or coal seams.
Intergenerational equity: resources and assets [such as quality and diversity of environment] which do not belong to any generation but are to be administered and preserved for all future generations.	**Intrusive criteria:** The intrusive criteria refers to noise that intrudes above the background level by more than 5 dB
Intrusive noise impact: can be measured using a long–term [cumulative noise exposure] criteria and/or a short–term [emission or immission] criteria, depending on the receiving environment.	**Land capability:** the ability of a parcel of land to be used for a given use sustainably, that is without permanent damage.
Leaching: the process of removing soluble matter[s] from soil or rock by water.	**L_{eq}:** the continuous sound pressure level that embodies the equivalent sound energy as the fluctuating source measured, over the same time period. These noise levels are often quoted with the time averaging period specified e.g. $L_{eq,\ 1hr}$.
Level of service: a measure used by traffic engineers to determine the effectiveness of elements of transportation infrastructure. LOS is most commonly used to analyze highways, but the concept has also been applied to intersections, transit, and water supply.	**Light vehicles:** cars, vans, motorbikes etc.
Linear peak: the peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.	**L_{max}:** the absolute single maximum noise level in a noise sample.
Lithology: the physical characteristics of a rock.	**Loam:** a medium, textured soil of approximate composition 10 - 25% clay, 25 - 50%, silt and <50% sand.

L_n: the noise level which is exceeded for *n*% of the time and is approximately the average of the maximum noise levels.	**Magnetite:** a ferrimagnetic mineral with chemical formula Fe3O4, one of several iron oxides and a member of the spinel group. Magnetite is the most magnetic of all the naturally occurring minerals on Earth.
Longwall [Mining]: a form of underground coal mining where a long wall of coal is mined in a single slice [typically 1-2 m thick]. The longwall "panel" [the block of coal that is being mined] is typically 3-4 km long and 250-400 m wide.	**Mean:** the average value of some characteristics in a set of data.
Matters of national environmental significance: the matters of national environmental significance protected under national environment law include: listed threatened species and communities, listed migratory species, Ramsar wetlands of international importance , Commonwealth marine environment, world heritage properties, national heritage places, the Great Barrier Reef Marine Park, nuclear actions.	**Meteorology:** science dealing with atmospheric phenomena and weather.
Median: a value above and below which there are equal numbers of data values.	**Native:** belong to the natural flora or fauna in a region.
Monocline: a step-like fold in rock strata consisting of a zone of steeper dip within an otherwise horizontal or gently-dipping sequence.	**Open cut mine:** a method of extracting rock or minerals from the earth by their removal from an open pit or borrow.
Net present value: the present value from future income from an investment project, less the cost. This method is used to evaluate investments, where the NPV of all cash outflows [such as the cost of the investment] and cash inflows [returns] is calculated by using a predetermined discount rate.	**Out- of -pit emplacement:** a stockpile of spoil or overburden transported and dumped away from the excavation of an open cut mine.
Opportunity cost: the cost of using resources for a certain purpose, measured by the benefit given up by not using them in their best alternative use. The best alternative forgone.	**Overburden:** rock and soil materials overlying a useful resource material such as coal.
Output: the goods or services resulting from production. Different amounts and combinations of inputs will lead to different amounts of output. If output is to be produced efficiently, then inputs should be combined in the optimum proportions.	**Peak particle velocity:** the maximum velocity of a particle of the transmission medium, used in assessment of vibration.
Overpressure: a transient air pressure, such as the shock wave from an explosion, that is greater than the surrounding atmospheric pressure.	**Percentile:** the value of a variable below which a certain percent of observations fall.
Ped: an individual, natural soil aggregate.	**Permian:** period follows the Carboniferous and extends from 299.0 ± 0.8 to 251.0 ± 0.4 Ma [million years before the present]. It is the last period of the Palaeozoic Era and famous for its ending epoch event, the largest mass extinction known to science.
Permeability: the capacity of rock or solid to transmit fluids [through pores, bedding planes or joints.	**Pleistocene:** the epoch from 2.588 million to 12 000 years BP covering the world's recent period of repeated glaciations.
Photomontage: the process [and result] of making a composite photograph by cutting and joining a number of other photographs.	**Potable water:** water of sufficiently high quality that it can be consumed or used without risk of immediate or long-term harm.

PM_{10}: notation used to describe particles of 10 micrometers or less.	**Present value:** the value today of a sum of money in the future. It is the discounted value of an individual payment or possibly a stream or flow of payments to be received at sometime in the future, applying a specific interest or specific discount rate e.g. inflation rate. Present value is the representation of future cash flows expressed in the value of today's dollar amount.
Podzolics: soils which are acidic throughout and have a clear boundary between the topsoil and subsoil. The topsoils are loams with a brownish grey colour. The lower part of the topsoil has a pale light colour and may be bleached with a nearly white, light grey colour.	**Primary visual catchment:** the area that contains the most critical viewing locations.
Primary view zone: the central most critical part of a view that is seen with the greatest clarity. It is that part of a view that is within a horizontal arc of 30^0 either side of the centre line of a view and a vertical arc of 30^0 above the horizontal.	**Qualitative:** data that is not quantified and may contain a high degree of subjectivity.
Principal visual elements [visual effect]: a measure of the visual interaction between a development and the landscape setting within which it is located.	**Quaternary:** the youngest of three periods of the Cenozoic era in the geologic time scale of the ICS. It follows after the Neogene period, spanning 2.588 +/- 0.005 million years ago to the present. The Quaternary includes two geologic epochs: the Pleistocene and the Holocene epochs.
Quantitative: an observation that can be measured.	**Regolith:** is a layer of loose, heterogeneous material covering solid rock.
Real-time monitoring: system or network that provides instantaneous access to data from monitoring station such as noise, dust, or water monitoring station. Real-time monitoring provides a proactive management tool that will allow ameliorative measures to be undertaken to prevent the occurrence of potential noise impacts.	**Revegetation:** the process of re-establishing a vegetation cover.
Rehabilitation: the process of restoring to a condition of usefulness following completion of mining activities.	**Run-of-mine:** the raw mined material as it is delivered by the mine cars, skips, or conveyors and prior to treatment of any sort.
Risk exposure: a simple calculation that gives a numeric value to a risk, enabling different risks to be compared. Risk Exposure of any given risk = Probability of risk occurring x total loss if risk occurs.	**Salinity:** a measure of the concentration of dissolved solids in water.
Saline [soil]: contains mineral salts that impair productivity.	**Seam:** an identifiable discrete coal unit.
Screen: the degree to which a development element is unseen due to intervening landscape elements such as topography or vegetation.	**Sedimentation:** a dam built to retard runoff from disturbed areas and allow sediment to settle out before letting clean water discharge.
Sedimentation: the collective name for processes that cause mineral and/or organic particles [detritus] to settle and accumulate or minerals to precipitate from a solution.	**Sedimentary rock:** the type of rock that is formed by sedimentation of material at the Earth's surface and within bodies of water.
Sewage: waste matter discharged to a sewer.	**Sewerage:** works for collecting, treating and disposing of sewage.
Siemens [S]: siemens denote the reciprocal of resistance: one siemens is equal to the reciprocal of one ohm.	**Soil unit:** a description of the common characteristics of an area of soil based on; soil phases [soil properties, such as saline, lithic, stony], three textural classes [coarse, medium, and fine], and three slopes classes superimposed [level to gently undulating, rolling to hilly, and steeply dissected to mountainous].

Sodicity: a measure of exchangeable sodium in the soil. High levels adversely affect soil stability, plant growth and/or land use.	**Soloths:** similar to a solodic soil but acidic throughout the profile. Tends to be a more typical soil of the humid regions where the exchangeable cations in the B Horizon of the solodised soils have been leached out.
Solodic soils: strong texture differentiation with a very abrupt wavy boundary between A and B horizons, a well developed bleached A2 horizon and a medium to coarse blocky clay B horizon.	**Steaming [thermal] coal:** medium to high ash, low sulfur thermal coals are used for domestic power generation and cement manufacture whilst medium to low ash, high energy thermal coals are exported.
Stakeholder: a person, group, organisation, or system who affects or can be affected by an organisation's actions.	**Strata [stratagraphic]:** a stratum [plural: *strata*] is a layer of rock or soil with internally consistent characteristics that distinguishes it from contiguous layers. Each layer is generally one of a number of parallel layers that lie one upon another, laid down by natural forces.
Still iso-thermal: refers to calm weather conditions [i.e. The absence of any wind or temperature gradients].	**Surface water:** water collecting on the ground or in a stream, river, lake, wetland, or ocean; it is related to water collecting as groundwater or atmospheric water. Surface water is naturally replenished by precipitation and naturally lost through discharge to evaporation and sub-surface seepage into the groundwater.
Stream gauge: a site along a stream where measurements of volumetric discharge [flow] are made.	**Tailings:** the materials left over after the process of separating the valuable fraction from the worthless fraction [gangue] of an ore.
Syncline: a downward-curving fold, with layers that dip toward the centre of the structure.	**Temperature inversion:** a positive temperature gradient. A meteorological condition where atmospheric temperature increases with altitude to some height.
Tapered element oscillating microbalance: an instrument for short-term monitoring of ambient aerosol fine mass concentration.	**Topography:** description of all the physical features of an area of land and their relative positions, either in words or by way of map.
Threatened species: animals that are in danger of extinction or may now be considered extinct, but have been seen in the wild in the last 50 years.	**Total operational employees:** employer directly employed by a company, excluding contractors.
Topsoil: the upper, outermost layer of soil, usually the top 5.1cm to 20cm. It has the highest concentration of organic matter and microorganisms and is where most of the Earth's biological soil activity occurs.	**Visual character unit:** areas of landscape that have similar topographic, vegetation and land use features that create areas of similar visual character.
Total suspended particles: a measure of the total amount of small solid or liquid particles suspended in or falling through the atmosphere.	**Vulnerable species:** a species specified in Part 1 of Schedule 2, *Threatened Species Conservation Act 1995 NSW*.
Visual sensitivity: the degree to which a change in the landscape will be perceived by a viewer, primarily based on both distance from a viewing point, and the popularity and function of that point.	**Watershed:** the area of land where all of the water that is under it or drains off of it goes into the same place.
Water balance: a water balance equation can be used to describe the flow of water in and out of a system. A system can be one of several hydrological domains, such as a column of soil or a drainage basin.	**Woodland:** land covered by trees which do not form a closed canopy.
Wind rose: a graphic tool used by meteorologists to give a succinct view of how wind speed and direction are typically distributed at a particular location.	