Section 7

Glossary of Technical Terms, Acronyms, Symbols and Units

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Technical Terms

Aboriginal Heritage Site – discrete area or concentration of artefactual material, place of past Aboriginal activity, or place of significance to Aboriginal people.

abs – Australian Bureau of Statistics.

acceleration lane – a lane used for increasing speed before merging with the through lanes.

acid – substance with a pH less than 7.0; the lower the pH, the higher the corrosive ability of the substance.

acid sulphate soil – common name given to sediment and soil containing iron sulphides (iron pyrite) which oxidise creating sulfuric acid.

aggregate – fragments of crushed rock with a defined size specified for use in the construction industry.

air contaminant – a substance in ambient atmosphere, resulting from the activity of man or from natural processes, causing adverse effects to man and the environment.

air pollutant – a substance in ambient atmosphere, resulting from the activity of man or from natural processes, causing adverse effects to man and the environment.

air pollution – presence of air pollutants.

alluvium – deposit of sand, mud, etc. formed by flowing water.

ambient – relating to conditions outside the active project area.

ambient air quality – the quality of the ambient air near ground level, expressed as concentrations or deposition rates of air pollutants – also expressed as existing air quality.

aquatic – living in or on water, or concerning water.

aquifer - rock or sediment capable of holding and transmitting groundwater.

arboreal – tree dwelling.

archaeology – the scientific study of human history, particularly the relics and cultural remains of the distant past.

artefact – anything made by human workmanship, particularly by previous cultures (such as chipped and modified stones used as tools).

association – an aggregation of botanically-related types which also have similar structure.

attenuation – reduction in sound pressure levels between two locations.

background noise levels – the level of the ambient sound indicated on a sound level meter in the absence of the sound under investigation (e.g. sound from a particular noise source: or sound generated for test purposes).

backfill – material used to fill created void.

basalt – fine-grained, dark volcanic igneous rock.

batter – receding slope from ground upwards.

bedrock – a general term for the rock, usually solid, that underlies soil or other unconsolidated, superficial material e.g. sand.

bench - a step in the face of a quarry which could be up to 15 m high.

biological diversity/biodiversity – a concept encompassing the diversity of indigenous species and communities occurring in a given region; biological diversity includes genetic diversity, which is the diversity of genes and genotypes within each species; species diversity, which is the variety of living species; and ecosystem diversity which is the diversity of the different types of communities formed by living organisms and the relations between them.

biophysical – relating to the biological and physical attributes of the environment.

biota – living components of a habitat.

bore – a well, usually of less than 20 cm diameter, sunk into the ground and from which water is pumped.

buffer – a physical barrier/structure or width of land that encloses, partially encloses, or defines a particular environment. A buffer serves to minimise the impacts of non-desirable external influences on the adjoining environment.

bulk density – for aggregate is the mass in the air of surface-dry particles divided by the saturated by surface-dry volume.

bulldozer – an item of tracked mobile earth moving equipment fitted with a front blade and with rear rippers used for pushing and ripping soil and rock.

bund wall – a man-made earth mound used to visually and acoustically screen nearby receivers.

catchment – the entire land area from which water (e.g. rainfall) drains to a specific water course or waterbody.

catchment area – the area determined by topographic features within which rainfall will contribute to runoff at a particular point.

chloride – the univalent negative ion of the element chloride (CI).

clay – very fine-grained sediment or soil (often defined as having a particle size less than 0.002 mm (2 microns) in diameter).

community – a combination of plants that are dependent on their environment and influence one another and modify their own environment. They form together, with their common habitat and other associated organisms, an ecosystem, which is also related to neighbouring ecosystems and to the macroclimate of the region.

coarse sand – sand predominantly >0.5mm.

compaction – the process of close packing of individual grains in a soil or sediment as a response to pressure.

concentration – the amount of a substance, expressed as mass or volume, in a unit volume of air.

conductivity – the dissolved salt content of water expressed in terms of µs/cm.

confluence - junction of streams.

conglomerate – coarse grained sedimentary rock (>2mm) consisting of subrounded fragments.

conservation – the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations, while maintaining its potential to meet the needs as aspirations of future generations.

consolidation – the process whereby loose or soft sedimentary material (e.g. an alluvial deposit) becomes a compacted, harder sedimentary material (e.g. a sandstone).

contaminant – any physical, chemical, biological or radiological substance or matter in water or soil that is not of natural origin.

contamination – the degradation of natural water quality as a result of man's activities. There is no implication of any specific limits, since the degree of permissible contamination depends upon the intended end use, or uses, of the water.

contour bank – an earth bank constructed across a slope parallel to contours.

cross-section – a two-dimensional diagram of an object presented as if the object had been cut along its length.

crushing – the mechanical process of reducing rock size usually by pressure or impact.

cutter-suction dredge – a floating machine that extracts sand through mechanically cutting and then pumping the sand to a processing plant.

cyclone – a conical shaped vessel designed to separate particles from a moving stream of either air or water.

deceleration lane – a lane used for decreasing speed of motor vehicles before leaving the road.

decibel – unit expressing difference in power between acoustic signals.

deposited dust – relatively large dust particles which settle out – not detrimental to health.

Development Application – an application for approval of an activity deemed to require an approval prior to commencement.

dewatering – part removal of water from an aquifer system in excess of natural recharge so that the potentiometric surface declines appreciably in the area of extraction.

dip – the angle that rock strata make with a horizontal surface measured at right angles to the strike.

diversion bank – an earth bank constructed to divert water away from disturbed areas.

drawdown – the difference between the water level observed during pumping and the non-pumping water level (static water level or static head).

dust - particles of mostly mineral origin generated by erosion of surfaces and the mining and handling of materials.

ecology – the relationship between living things and their environment.

ecologically sustainable development (ESD) – 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.

ecosystem – a functional unit of energy transfer and nutrient cycling in a given place, it includes all the relationships within the biotic community and between the biotic components of the system.

electrical conductivity (EC) – the ability of a substance (either solid, liquid or gas) to transmit electricity – an indicator of salinity.

emission – a discharge of a substance (e.g. dust) into the environment.

emission factor – an expression for the rate at which a pollutant is generated as a result of some activity, divided by the level of that activity.

environment – a general term for all the conditions (physical, chemical, biological and social) in which an organism or group of organisms (including human beings) exists.

environmental constraints - limitations on a project by components of the environment.

Environmental Assessment – a formal description of a project and an assessment of its likely impact on the physical, social and economic environment. The *Environmental Assessment* is used as a vehicle to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation.

Environmental Impact Statement (EIS) – a document that describes a project and an assessment of its likely impact on the physical, social and economic environment. It includes an evaluation of alternatives and an overall justification of the proposal. An EIS is used as a vehicle to facilitate public comment and as the basis for analysing a proposal with respect to granting approval under relevant legislation.

environmental policy – statement by the organisation of its intentions and principles, in relation to the overall environmental performance, which provides a framework for action and for the setting of its environmental objectives and targets (AS ISO 14050).

ephemeral – lasting only a short time.

ephemeral creek – creek in which flow is intermittent, usually short term following rainfall.

erodibility – the tendency of soil, earth or rock to erode.

erosion – the wearing away of the land surface (whether natural or artificial) by the action of water, wind and ice.

evaporation – the loss of water as vapour from the surface of a liquid that has a temperature lower than its boiling point.

excavate – to dig into natural material or fill using an excavator or other machinery.

excavator - item of earth moving equipment fitted with a bucket on an articulated boom

and used for digging material from a face in front of, or below the machine. An excavator would be used around the perimeter of the lakes.

existing air quality – the quality of ambient air near ground level, expressed as concentrations or deposition rates or air pollutants – also expressed as ambient air quality.

exotic - introduced or foreign, not native.

extraction – a term synonymous with quarrying and dredging.

face – sub-vertical quarry feature generally forming limits of benches.

fallout – the sedimentation of dust or fine particles in the atmosphere.

fauna – a general term for animals (birds, reptiles, marsupials, fish etc.) particularly in a defined area or over a defined time period.

fill – material imported and emplaced to raise the general surface level of a site.

final void – cavity created by material extraction.

fines – material such as clay or silt sized particles.

fines return pond – excavation for placement of fine materials washed from the dredged and processed sand.

flora – a general term for plant, particularly those found in a defined area or characteristic of a defined time period.

fluvial – pertaining to or produced by a river.

formation (or unit) – a (named) succession of sedimentary beds having some common characteristics.

fractures – any breakage of a rock mass along a direction or directions not associated with cleavage or fissility.

friable – easily crumbled as in poorly cemented rocks.

fresh rock – rock unaffected by natural weathering processes.

front-end loader – machine used to lift and place soil, earth, rocks, etc. on a construction site.

geochemical – chemical aspects of the composition of the earth's crust.

geomechanical – the materials engineering of rock properties and behaviour when forces or loads are applied to the rock mass.

geotechnical – technical or engineering aspects relating to soil, rock and other materials.

gradient – rate of change of a given variable (such as temperature or elevation) with distance.

groundcover – vegetation that grows close to the ground (such as grasses and herbs) providing protection from erosion.

groundwater – all waters occurring below the land surface; the upper surface of the soils saturated by groundwater in any particular area is called the water table.

groundwater discharge – a low place in the landscape that intersects a groundwater aquifer, allowing it to discharge to the surface.

habitat – the place where an organism normally lives; habitats can be described by their floristic and physical characteristics.

haul road – road used in a quarry for haulage of rock from the active face to the crusher and for general site access.

Hawkesbury Sandstone – the prominent cliff-forming sandstone that occurs around Sydney's eastern suburbs and lies beneath the Kurnell Peninsula.

heavy metals – normally trace metals which occur in ore deposits and may be environmentally hazardous.

heritage – the things of value which are inherited.

heritage significance – of aesthetic, historic, scientific, cultural, social, archaeological, natural or aesthetic value for past, present or future generations.

highly weathered rock – rock affected by considerable weathering to the extent that it is friable.

hydraulic conductivity (k) – the rate of flow of water in an aquifer through a cross section of unit area under a unit hydraulic gradient, at the prevailing temperature. Usually expressed in units of metres per second or metres per day.

hydraulic gradient - the direction of flow of groundwaters.

hydrocarbon – any organic compound, gaseous, liquid, or solid, consisting solely of carbon and hydrogen. Crude oil is essentially a complex mixture of hydrocarbons.

hydrocyclone – a cyclone specifically designed for wet applications.

hydrogeology – the study of groundwater.

hydrology – the study of water, particularly its movement in streams, rivers, or underground.

impact – the effect of human induced action on the environment (modified from Westman, 1985)

in-situ – a term sued to distinguish material (e.g. rocks, minerals, fossils, etc.) found in its original position of formation, deposition, or growth, as opposed to transported material.

indigenous – belonging to, or found naturally in, a particular environment (see also exotic).

infrastructure - the supporting installations and services that supply the needs of a project.

Inter-generational equity – the present generation should ensure that the health, diversity and the productivity of the environment is maintained or enhanced for the benefit of future generations.

intermittent - flows periodically, irregularly.

intra-generational equity – the present generation should ensure that improved well-being and welfare are accessible to all sectors of society within Australia does not result in decreased welfare in other nations.

inversion – weather term for surface defining boundary between two layers of air or different temperatures.

invertebrates – commonly, animals without a backbone (jellyfish, worms, molluscs, etc.).

joints – a fracture (see FRACTURE) in rock between the sides of which there is no observable relative movement.

landform – a specific feature of a landscape (such as a hill) or the general shape of the land.

lithic sandstone – sedimentary rock of sand grade in which rock fragments are proportionally more important that feldspar grains.

lithology – refers to the general characteristics of sediments.

loam – loose soil composed of clay and sand, especially a kind containing organic matter and of great fertility.

Local Environmental Plan (LEP) - a plan developed by a council to control development in part or all of its local government area.

macrophyte – vascular plant.

mammal – animal of the class mammalia, distinguished by the presence of hair and mammary glands.

matrix – fine grained constituent of some sedimentary rocks containing coarser grains and fragments.

micro-organisms – organism such as bacteria not visible to the naked eye.

migratory – passing, usually predictably (based on aquatic species), from one region or climate to another, for purposes of feeding, breeding, or other biological purposes.

mitigation measures – measures employed to reduce (mitigate) an impact (such as the construction of a perimeter bund to reduce sound emissions).

mobile equipment - wheeled or tracked self-propelled equipment such as trucks and front-end loaders.

monitoring – systematic sampling and, if appropriate, sample analysis to record changes over time caused by impacts such as mining.

mortar sand plant – a dry processing plant designed to separate the sand from oversize material by simple vibration and screening.

mottling – multi-coloured effect in soils – grey and yellow-brown is common.

mulch – straw, leaves, loose earth, etc. spread on the ground or produced by tillage to protect the roots of newly planted trees, crops, etc.

native – said of an organism or group of organisms that is restricted to a particular region or environment. A local inhabitant of a place.

National Park - an area set aside for the protection of flora and fauna and for public recreation.

non-perennial – refers to streams which do not flow the whole year through – also known as intermittent streams.

noxious – introduced species considered to be harmful to native species or to the habitat of native species.

offsets – to offset an activity means to compensate for the negative impacts of that activity, by taking a separate action with positive impacts.

operational constraints – limitations upon a project by equipment or machinery.

overburden - subsoil and decomposed rock overlying the main rock body that is not suitable for use in the final product.

oxidation – the process of combining with oxygen.

paleo channel – a former river or stream course now infilled by deposits of sand and gravel.

panaramitee – the name given to a style, tradition or method of applying motifs to a rock surface first identified by Robert Edwards in the 1960s. The motifs, which comprise mainly of circles and animal tracks, but which include human footprints, plan aspects of animals, and linear designs, were pecked into the rock surface using indirect percussion, i.e. Using a pecking-tool and a hammerstone.

particulate matter - small solid or liquid particles suspended in or falling through the atmosphere - sometimes expressed by the term particulates.

perennial – refers to stream which has flow throughout the year.

perimeter – outer boundary.

permeability - a material property relating to the ability of the material to transmit water.

permeable – able to transmit fluids e.g. groundwater.

Permian – the geological period of time from 280 to 225 million years before present.

pH – a measure of the degree of acidity or alkalinity of a solution; expressed numerically (logarithmically) on a scale of 1 to 14, on which 1 is most acid, 7 is neutral acid, and 14 is most basic (alkaline).

photomicrograph – photograph taken through a microscope.

piezometer – a hole drilled and fitted specifically for the monitoring of groundwater levels and water quality.

podzolic – soil descriptive term for soils that are strongly acid and highly differentiated.

pollution – the alteration of air, soil, or water as a result of human activities such that it is less suitable for any purpose for which it could be used in its natural state.

population – a group of organisms all of the same species occupying a particular area.

porous - containing voids, pores, interstices or other openings which may or may not be interconnected.

porphyritic – a textural term describing rock containing relatively large crystals set in a finer-grained "groundmass".

potable - water suitable for human consumption.

potentiometric surface – equilibrium standing groundwater level.

powerscreen – a simple mobile item of equipment normally used to separate two sizes of material.

precautionary principle – where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

processing plant – a group of equipment used to clean and grade sand.

processing screen – a screen used to separate various sizes of material for further crushing or product screening.

product screen – used in the final size of the product.

product truck – a registered truck used for the delivery of products from the quarry to the customer.

production bore – a small diameter hole from which groundwater is extracted. It usually relates to a cased and screened, adequately developed and efficient bore used for groundwater removal.

progressive rehabilitation – rehabilitation of disturbed areas as soon as practicable after they are no longer required during the life of a project.

Project Site – the total area covered by the project, including extraction areas, processing plant, silt storage, overburden emplacements, stockpiles, bunds, ponds, etc.

pyrite –the most wide-spread sulphide material FeS_2. Found in many geological settings.

quadrat – a square survey area.

quarry – incorporates one or more extraction areas from which construction materials are extracted together with associated equipment and infrastructure.

quartz – crystalline silica, an important rock-forming mineral SiO_2.

quartz – the most common form of silica (SiO_2) usually clear or while.

Quaternary – geological period of time from 2 million years before present to present.

Ramsar listed wetlands – wetlands recognised to have considerable ecological value in accordance with the Ramsar convention.

raw feed – material from the active extraction area – of a size suitable for processing.

recent – geological time period representing the last 5 000 years.

recharge – the addition of water to an aquifer, directly from the surface, indirectly from the unsaturated zone, or by discharge from overlying or underlying aquifer systems.

recolonise – the process of animal and plant species re-establishing themselves in a disturbed area.

recovery – the difference between the observed water level during the recovery period following pumping and the maximum drawdown when pumping stops.

Regional Environmental Plan (REP) – a plan by the State Government Department responsible for planning where controls on development are considered on a regional and state-wide basis.

regrowth – a forest stand established by natural regeneration after major disturbance of the previous forest canopy by wildfire, windthrow or logging.

rehabilitation - the progressive formation of a landform after quarrying and its stabilisation with grasses, trees and/or shrubs.

reptiles – cold-blooded vertebrates, including lizards, snakes, turtles, and crocodiles.

reserves – refers to an estimated quantity of usable material.

resource – an estimate of potentially usable material in a defined area based on preliminary geological information; recoverable material of economic interest.

respirable dust – dust that is capable of being breathed in.

revegetated – an area that has been planted with trees, bushes and grasses after being disturbed.

revegetation - replacement of vegetation, principally grasses and legumes on areas disturbed by quarrying activities.

riparian – pertaining to or situated on the bank of a river or creek.

ripping - breaking up of ground with a bulldozer using an action similar to a rake.

road base – road pavement usually made up of densely graded crushed rock in varying sizes.

runoff – that portion of the rainfall falling on a catchment area that flows from the catchment past a specified point.

saline – water with high salt concentration.

salinity – the dissolved content of water expressed in terms of milligrams per litre.

sand - sediment comprising particles in 0.063mm to 2mm size range.

sand slurry – sand mixed with water.

sandstone - general term for sedimentary rock with grain size from 0.063mm to 2mm - grains may be minerals or rock fragments.

Scarify – to stir the soil without altering its form, or disturbing its sequence of layers.

screening – a process which separates crushed rock into various fractions – this usually involves a mechanical vibration of the rock over a series of decks fitted with steel mesh, steel plate or polyurethane or rubber mats with fixed size apertures.

sediment basin – a small excavation designed to trap the coarse material washed from disturbed areas.

sedimentary rocks – rocks formed from material derived from pre-existing rocks or by chemical precipitation.

sedimentation – process or rate of depositing of sediment.

seepage – emergence of subsurface flow at the ground surface.

Shale – fine grained sedimentary rock types such as siltstone or mudstone which part readily along well-defined bedding planes.

silica – silicon dioxide (SiO_2).

siliceous – having a high silica (quartz) content.

silicified – to be converted into silica (SiO_2) or to have silica added.

silt – a classic sediment, most of the particles of which are between 0.063mm and 0.004mm in diameter.

siltstone – general term for sedimentary rock with grain sizes from 0.004mm to 0.063mm – individual grains not discernible with unaided eye.

silt stop fencing – fine mesh fencing normally installed downslope of a sediment source, designed to trap silt and sediment and allow the water to pass through.

social equity – embraces value concepts of justice and fairness so that the basic needs of all the sectors of society are met and there is a fairer distribution of costs and benefits to improve the well-being and welfare of the community, population or society.

solodic – soil descriptive term for soils that are mildly leached.

spatial – related to areal extent.

species – a taxonomic grouping of organisms that are able to interbreed with each other but not with members of other species.

species diversity – a measure of the number of different species in a given area.

specific gravity – the weight of any body or substance considered with regard to the weight of an equal bulk of pure water.

standing water – water that is pooled and still.

stockpile – a pile used to store material (such as low-grade ore) for future use.

storage capacity – the maximum volume of liquid able to be retained in a structure.

stormwater – surface water runoff reaching stream channels immediately after rainfall.

subcatchment – a smaller area within a catchment drained by one or more tributaries of the main waterbody.

subsoil – surface material comprising the B and C Horizons of soil with distinct profiles; often having brighter colours and higher clay contrasts.

sulfate – a bivalent negative ion of sulphur and oxygen (SO_4).

surface waters – all water flowing over, or contained on, a landscape (e.g. runoff, channels, ponds, etc.).

surge box – part of processing plant that regulates flow from dredge.

suspended solids – solids held in suspension by the turbulent flow of a fluid.

sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commission on Environment and Development 1990).

temperature inversion - an increase in air temperature with height.

temporal – related to time.

Tertiary – geological time period, 2-60 million years ago, comprising Palaeocene and Pliocene epochs.

terrestrial – of or relating to the land, as distinct from air or water.

topography – the physical relief and contour of a region.

topsoil – the upper layer of soil, usually containing more organic material and nutrients than the subsoil beneath it.

total suspended solids – a common measure used to determine suspended solids concentrations in a waterbody and expressed in terms of mass per unit of volume (e.g. milligrams per litre).

tributary – a stream or river that flows into a larger river or lake.

turbidity – discolouration of or suspension of particles in water resulting in a reduction in clarity.

unconsolidated – loose or soft, not compacted (particularly soil or sediment).

understorey – the layer of forest vegetation between the overstorey (or canopy) and the ground layer.

vehicle movement – a one-way trip.

visual amenity – attractiveness to the eye.

volcanics – a general term applied to rock types of volcanic origin (e.g. basalt).

wash plant – a plant designed to wash unwanted sized materials from product.

water quality – degree of the lack of contamination of water.

water table – the upper limit of the saturated zone within a rock mass, generally at atmospheric pressure. It is characteristic of unconfined aquifers.

watercourse – stream or river, running water.

weathered rock – rock affected to any degree by the processes of chemical or physical weathering.

weathering – the group of processes (e.g. action or air, rain, water, etc.) change in character, decay and eventually crumble to soil.

weed – any plant (in particular an herbaceous one) that survives in an area where it is harmful or troublesome to the desired land use.

wet processing area – a plant designed to wash unwanted sized materials from product.

wetland – a low-lying area regularly inundated or permanently covered by shallow water.

wildlife – non-domesticated fauna.

wildlife corridor – a strip of vegetation that has a design purpose of allowing animals to pass from one area to another and acting as an undisturbed area for wildlife preservation.

wind erosion – wearing away of exposed soil, earth, or rock surfaces by the abrasive action of wind-blown particles (e.g. grains of sand).

yield – (of a water bore) 1) the capacity of the bore to produce water. 2) the amount of water actually withdrawn.

Acronyms

AHD – Australian Height Data (in metres)

ANZECC – Australian and New Zealand Environment and Conservation Council

AS – Australian Standard

ENM – excavated natural material

LEP – Local Environmental Plan

NHMRC – National Health and Medical Research Council

SEPP – State Environmental Planning Policy

VENM – Virgin Excavated Natural Material

Symbols and Units

% – percentage

< – less than

> – greater than

cm – centimetre (unit of measure)

dB – decibel, unit used to express sound intensity

dB(A) – the unit of measurement of sound pressure level heard by the human ear, expressed in "A" scale

kg – kilogram (weight measure)

kL – kilolitre (thousand litre)

km – kilometre (= 1 000 metres)

L – litre

L/s – litres per second

L_{A90} – sound level exceeded 90 per cent of the sampling time

L_{Aeq} – the L_{Aeq} is the "equal energy" average noise levels, and is used in some instances for the assessment of traffic noise effects or the risk of hearing impairment due to noise exposures

L_{Amax} – the absolute maximum noise level measured in a given time interval

m – metre

m AHD – metres Australian Height Datum

m^2 – square metre

m^3 – cubic metre

mg – milligram (weight unit)

mg/L – milligrams per litre (parts per million)

ML – megalitre

Mt – million tonnes (metric tonne = 1 000 kg)

Mtpa – million tonnes per annum

pH – a measure of the degree of acidity or alkalinity of a solution; expressed numerically (logarithmically) on a scale of 1 to 14, on which 1 is most acidic, 7 is neutral acid, and 14 is most basic (alkaline)

PM_{10} – particulate matter <10μm in diameter

t – tonnes

TDS – total dissolved solids expressed in mg/L

tpa – tonnes per annum

μg/m^3 – micrograms per cubic metre

μS/cm – micro seimens per centimetre