Glossary, Abbreviations and Units

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Glossary	
Term	**Definition**
Airlift yield	volume of water per unit of time blown from the borehole during drilling (l/s)
Alluvial	sediments deposited by flowing water
Alluvial aquifer	an aquifer formed of unconsolidated material deposited by water, typically occurring adjacent to river channels and in buried or palaeochannels
Alluvium	general term for unconsolidated deposits of inorganic materials (clay, silt, sand, gravel, boulders) deposited by flowing water
Anisotropic	having some physical property that varies with direction
Aquatic	associated with and dependant on water e.g. aquatic vegetation
Aquatic Ecosystems	abiotic (physical and chemical) and biotic components, habitats and ecological processes contained within rivers and their riparian zones and reservoirs, lakes, wetlands and their fringing vegetation
Aquiclude	bed, formation or group of formations essentially impervious to water
Aquifer	saturated permeable geological unit that is permeable enough to yield economic quantities of water to boreholes
Aquifer system	heterogeneous body of intercalated permeable and less permeable material that acts as a water-yielding hydraulic unit of regional extent
Aquifer testing	process whereby an aquifer is subjected to pumping from a borehole under controlled test conditions in order to determine the hydraulic parameters of the groundwater system through its response to stress of abstraction
Aquitard	saturated geological unit with a relatively low permeability that retards and restricts the movement of water, but does not prevent the movement of water; while it may not readily yield water to boreholes and springs, it may act as a storage unit
Arboreal	living in trees
Assemblage	a group of species co-occurring at a location
Available drawdown	height of water above the depth at which the pump is set in a borehole at the time of water level measurement (m)
Averaging period	time period over which air quality measurements or predicted impacts are averaged

Bank storage	water that percolates laterally from a river in flood into the adjacent geological material, some of which may flow back into the river during low-flow conditions
Baseflow	amount of groundwater flowing into a river
Borehole	a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer. Interchangeable with bores, wells, piezometers
Brackish	water that contains between 1,000 and 10,000 mg/L of dissolved solids
Brine	water that contains more than 35,000 mg/L of dissolved solids
Buffer	area of vegetation providing protection from disturbance
Carbonaceous	defining attribute of a substance rich in carbon
Carrying capacity	the number of individuals that can be supported in a given area within natural resource limits without degradation of those resources. The carrying capacity for any given area is not fixed
Catchment	area from which any rainfall will drain into the watercourse, contributing to the runoff at a particular point in a river system; synonymous with the term river basin
Community	group of populations of plants and animals in a given place
Cone of depression	convex upward shape of the cone of the piezometeric groundwater surface which defines the area of influence of a borehole
Confined aquifer	aquifer overlain by a confining layer of significantly lower hydraulic conductivity in which groundwater is under greater pressure than that of the atmosphere; the aquifer is bounded above and below by an aquiclude
Confining layer	layer of low permeability material overlying an aquifer, which restricts the vertical movement of water
Connectivity	the connectedness between patches of suitable habitat for an individual species or group of species
Conspecific	the same species
Contamination	introduction of any substance into the environment by human activities
Corridor	a continuous link of suitable habitat between two vegetation patches allowing movement by fauna
Crepuscular	active at dawn and dusk
Cryptic	difficult to observe
Dasyurid	carnivorous/insectivorous marsupials

Discharge area	area in which subsurface water, included water in the unsaturated and saturated zones, is discharged at the land surface
Discharge rate	volume of water per unit of time abstracted from a borehole
Dispersal	movement away from an existing population or away from the parent organism to maintain or expand populations
Dissolved solids	minerals and organic matter dissolved in water
Diurnal	active during the day
Dominant	one or more species, by means of their number, coverage, or size that exerts considerable influence upon or control of the conditions of existence of associated species
Drawdown	drop in water level below the general level occurring when a borehole is pumped
Duricrust	hardened soil crust
Ecosystem	organic community of plants, animals and bacteria and the physical and chemical environment they inhabit
Ecosystem function	processes including soil formation and stabilisation, nutrient cycling, water infiltration, pollination and seed production
Ecotonal (ecotone)	transitional zone between two diverse communities/habitats
Effective storage	volume of groundwater an aquifer takes in and releases is limited by the storage capacity. Aquifers may be regularly recharged but have insufficient storage to contain the recharge thus seasonal seeps are formed and the aquifer is incapable of storing groundwater volumes over extended dry periods
Endemic	a species restricted to a particular place or region
Ephemeral	a stream or creek that carries water only during or immediately after rainfall
Ephemeral	a stream or creek that carries water only during or immediately after rainfall
Ephemeral river	storm-event driven rivers where flow occurs less than 20% of the time; these rivers have limited baseflow component with no groundwater discharge
Exotic	an introduced species
Extant	still in existence
Extralimital	occurring outside the area in question
Fault	zone of displacement in rock formations resulting from forces of tension or compression in the earth's crust
Fecundity	reproductive output; number of offspring produced

Fitness for use	water quality is such that it meets the requirements for a particular use; domestic, agricultural, industrial, recreational, or environmental
Flow regime	recorded or historical sequence of flows used to create a hydrological profile of a water resource
Fluvial	relating to or arising from the action of flowing water in a river
Flux	rate of groundwater flow per unit width of aquifer
Formation	general term used to describe a sequence of rock layers
Fracture	any break in a rock including cracks, joints, and faults
Fractured aquifer	aquifer that owes its water-bearing properties to fracturing caused by folding and faulting
Fresh water	water that contains less than 1,000 mg/L salts
Gilgai	depression in an irregular land surface
Groundwater	water found in the subsurface in the saturated zone below the water table or piezometeric surface i.e. the water table marks the upper surface of groundwater systems
Groundwater flow	movement of water through openings and pore spaces in rocks below the water table i.e. in the saturated zone
Groundwater resource	groundwater available for beneficial use, including man, aquatic ecosystems and greater environment
Heterogeneity (heterogeneous)	consisting of dissimilar or diverse constituents (species and/or structure)
Heterogeneous	materials having different properties at different points; diverse in character or content; in reality, all aquifers are heterogeneous, although homogeneity is assumed to simply their analysis
Homogeneity (homogeneous)	composed of species and/or structure that are all the same or similar
Homogeneous	characteristic of the geological unit in which hydraulic conductivity is independent of position or direction; opposite of heterogeneous
Hydraulic conductivity	measure of the ease with which water will pass through earth material; defined as the rate of flow through a cross-section of one square metre under a unit hydraulic gradient at right angles to the direction of flow (m/day)
Hydraulic gradient	change in the hydraulic head over a certain distance
Hydraulic head	elevation to which water will rise in a borehole connected to a point in an aquifer
Hydrology	study of the properties, circulation and distribution of water
Infiltration	downward movement of water from the atmosphere into the ground; not to confused with percolation

Intergranular flow	flow that occurs between individual grains of rock
Isotropic	condition of having properties that are uniform in all directions, opposite of anisotropic
Jump-up	a mesa, an area of land with a flat top and steep sides rising above the surrounding landscape
Landform	a geomorphological unit
Landform	a geomorphological unit
Lithic	relating to or composed of stone
Lithology	physical character of rocks
Lotic	running water; streams, rivers and creeks
Macro-invertebrate	aquatic invertebrates visible to the naked eye
Macrophyte	emergent, submergent or floating plants that are not microscopic
Major aquifer	highly permeable formations, usually with a known or probable presence of significant fracturing, may be highly productive and able to support large abstractions for public supply and other purposes; water quality is generally very good
Micro-bat	bats belonging to the suborder Microchiroptera, typically small, insectivorous and able to echolocate
Microchiropteran	bats belonging to the suborder Microchiroptera
Micro-habitat	a small localised habitat within a larger ecosystem
Minor aquifer	fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability; aquifer extent may be limited and water quality variable
Nomenclature	system of names, terminology
Non aquifer	formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities; groundwater bodies, which are essentially impermeable, do not readily transmit water and/or have a water quality which renders it unfit for use
Nutrients	substances that help living things grow, e.g. nitrogen, phosphate, potassium
Oxidation	addition of oxygen to a compound; entails the loss of an electron
Palaeochannel	buried stream channel
Passage	en route during migration
Patchiness of vegetation	heterogeneity of vegetation

Perched aquifer	aquifers that contain perched groundwater i.e. bodies of groundwater separated from an underlying body of groundwater by an unsaturated zone
Percolation	process of the downward movement of water in the unsaturated zone under the influence of gravity and hydraulic forces; term used to differentiae from infiltration, which specially refers to the movement of water from the atmosphere into the ground
Permeability	ease with which a fluid can pass through a porous medium and is defined as the volume of fluid discharged from a unit area of an aquifer under unit hydraulic gradient in unit time (m/day)
Permeable	materials that allow liquids to flow through it
pH	absolute value of the decimal logarithm of the hydrogen-ion concentration (activity); used as an indicator of acidity (pH < 7) or alkalinity (pH > 7)
Piezometeric level	elevation to which groundwater levels rise in boreholes that penetrate confined or semi-confined aquifers
Piezometeric surface	imaginary surface representing the piezometeric pressure or hydraulic head throughout all or part of a confined or semi-confined aquifer
Pollution	introduction into the environment of any substance by the action of man, which is or results in significant harmful effects to man or the environment
Porosity	porosity of a water-bearing formation is determined by that part of its volume consisting of openings or pores
Potable water	water that is safe and palatable for human use
Preferential flow	preferential movement of groundwater through more permeable zones in the subsurface
Primary aquifer	aquifer in which water moves through the original interstices of the geological formation
Quartzose	containing, or resembling, quartz; partaking of the nature or qualities of quartz
Recharge	recharge is defined as the process by which water is added from outside to the z zone of saturation of an aquifer, either directly into a formation, or indirectly by way of another formation
Rehabilitation	restore to former condition or status
Remediation	restore to health, requires that impact is reduced to some acceptable level
Resource	quality of all aspects of a water resource including (a) the quality, pattern, timing, water level and assurance of instream flow, (b) the water quality, including the physical, chemical and biological characteristics of water, (c) the characteristic and condition of the instream and riparian habitat; and (d) the characteristics, condition and distribution of aquatic biota

Rest water level	groundwater level in a borehole not influenced by abstraction; synonymous with static water level, but no groundwater levels are ever truly static as they continually respond to recharge, discharge and abstraction
River	physical channel in which runoff will flow; generally larger than a stream, but often used interchangeably
Runoff	surface and subsurface flow from a catchment, but in practice refers to the flow in a river i.e. excludes groundwater not discharged into a river
Safe Yield	amount of water that can be withdrawn from an aquifer without producing an undesired effect like water level reaching the position of the main water yielding fracture
Saline water	water that is generally considered unsuitable for human consumption or for irrigation because of its high content of dissolved solids
Saturated zone	subsurface zone below the water table where interstices are filled with water under pressure greater than that of the atmosphere
Seasonal river	rivers driven by seasonal rainfall patterns where flow occurs between 20% and 80% of the time; these rivers have a limited baseflow component with little or no groundwater discharge
Secondary aquifer	aquifer in which water moves through secondary openings and interstices, which developed after the rocks were formed i.e. weathering, fracturing, faulting
Secondary interstices	openings in the rock that were developed by processes that affected the rocks after they were formed
Sediment	particles derived from rocks or biological material that have been transported by air or water
Seep	diffuse wetland area where interflow and groundwater emerges, usually at a slow rate or small volume, to become surface flow
Semi confined aquifer	aquifer that is partly confined by layers of lower permeability material through which recharge and discharge may occur, also referred to as a leaky aquifer
SIGNAL analysis	Stream Invertebrate Grade Number – Average Level; a biotic index for measuring habitat quality based on invertebrate families
Source population	breeding group that produces enough offspring to be self-sustaining and that often produces excess young that must disperse to other areas
Specific yield	ratio of the volume of water that a given mass of saturated rock or soil will yield by gravity from that mass
Spring	point where groundwater emerges, usually as a result of topographical, lithological or structural controls
Static water level	rest water level

Stepping stones	disconnected patches of habitat that more mobile species, or species with some tolerance of modified habitat, move through from one vegetation patch to another
Storage coefficient	volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head
Storativity	storage can be defined as the volume of water that a saturated confined aquifer releases from storage per unit surface area of the aquifer per unit decline in the water table. Quantifies the aquifers ability to release water
Successional (succession)	replacement of one kind of community by another kind
Surface runoff	part of the total runoff that travels over the ground surface to reach a stream or river channel
Sustainable yield	safe amount of water that can be abstracted from a borehole over a long period of time (usually 1 or 2 years) without the water level reaching the position of the pump or main water strike
Synergistically (synergism)	interaction of different components that produces a total effect greater than that of the sum of the individual effects
TDS	concentration of dissolved salts
Through flow	movement of water horizontally beneath the land surface; it occurs once water has infiltrated the soil; the water moves downwards under gravity and because the soil becomes more compact and less permeable with increasing depth, water will begin to move sideways at speeds of between 0.005 to 0.3 m/h. It usually happens when the soil is completely saturated with water
Transmissivity	rate at which water is transferred through a unit width of an aquifer under a unit hydraulic gradient; it is expressed as the product of the hydraulic conductivity and the thickness of the saturated portion of an aquifer. Transmissivity is the rate at which water moves through the aquifer
Transpiration	evaporation of water from plants
Unconfined aquifer	aquifer with no confining layer between the water table and the ground surface where the water table is free to fluctuate
Unsaturated zone	part of the geological stratum above the water table where interstices and voids contain a combination of air and water; synonymous with zone of aeration or vadose zone
Vadose zone	same as unsaturated zone
Volant	capable of flying
Vulnerability	the tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer

Water table	surface within the zone of saturation of an unconfined aquifer over which the pressure is atmospheric
Well field	group of boreholes in a particular area usually used for groundwater abstraction purposes
Well point	shallow, small diameter hole used to abstract groundwater from primary aquifers
Wind-throw	trees uprooted by wind
Yield	quantity of water removed from a water resource e.g. yield of a borehole

Abbreviations	
Term	Abbreviation
AADT	Average annual daily traffic
ABS	Australian Bureau of Statistics
ADT	Average daily traffic
AEMSC	Australian Explosives Manufacturer Safety Committee
AEP	Annual exceedence probability
AHD	Australian Height Datum
am	Ante meridiem (time between midnight and noon)
ANC	Acid Neutralising Capacity
ANFO	Ammonium nitrate/fuel oil
ANZECC	Australian and New Zealand Environmental Conservation Council
ARI	Average Recurrence Interval
ASD	Autisim Spectrum Disorder
ASS	Acid Sulphate Soils
ATODS	Alcohol, Tobacco and Other Drug Services
ATP	Authorities to prospect
BAAM	Biodiversity Assessment and Management Pty Ltd
BBCGP	Bowen Basin Coal Growth Project
BBKY	Barada/Barna/Kabelbara/Yetimarala
BBN	Bringalow Belt North
bcm	Bank cubic metres
BCR	Benefit-Cost Ratio
BHPB	BHP Billiton
BLM	United States Bureau of Land Management
BMA	BHP Billiton Mitsubishi Alliance Coal Operations Pty Ltd
BOM	Bureau of Meteorology
BPA	biodiversity planning assessment
Brundtland Commission	World Commission on Environment and Development
C.Q.C.A.	Central Queensland Coal Associates

Ca	Calcium
CAMBA	China-Australia Migratory Bird Agreement
CASA	Civil Aviation Safety Authority
CEC	Cation exchange capacity
CEO	Chief Executive Officer
CFMEU	Construction Forestry Mining Energy Union
CG	Coordinator-General
CH4	Methane
CHMP	Cultural Heritage Management Plan
CHPP	Coal Handling and Preparation Plant
CLR	Contaminated Land Register
cm	Centimetres
CMS/Bonn Convention	Conservation of Migratory Species of Wild Animals
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
CPP	Coal Preparation Plant
CPP	Community Partnership Program
CPRS	Carbon Pollution Reduction Scheme
CQCA	Central Queensland Coal Associates Joint Venture
CQRPAC	Central Queensland Regional Planning Advisory Committee
CQU	Central Queensland University
CRA	Conzinc Riotinto of Australia
CRG	Community Reference Group
CSG	Coal Seam Gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSRM	Centre for Social Responsibility in Mining
dBA	A-weighted decibels
DBCT	Dalrymple Bay Coal Terminal
DBH	Diameter at Breast Height
DEEPI	Department of Employment, Economic Development and Innovation
DEO	Desired Environmental Outcomes

DERM	Department of Environment and Resource Management
DEWHA	Department of Environment, Water, Heritage and the Arts
DIDO	Drive-in, drive-out
DIP	Department of Infrastructure and Planning (QLD)
DL	Dysart Lower
DMC	Dense Medium Cyclone
DME	Queensland Department of Mines and Energy
DMR	Queensland Department of Main Roads
DNRW	Department of Natural Resources and Water
DO	Disolved Oxygen
DOC	Department of Communities
DOS	Degree of Saturation
DPI	Queensland Department of Primary Industries
ds/m	Deci-Siemens/metre
DTMR	Queensland Department of Transport and Main Roads
EC	Siemens/metre
eCEC	Effective cation exchange capacity
EEO	Energy Efficiency Opportunities
EIS	Environmental Impact Statement
ELAM	Emergency and Long-term Accommodation in Moranbah
EM	Environmental Management
EM Plan	Environmental Management Plan (EM Plan)
EMP	Environmental Management Programs
EMR	Environmental Management Register
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPBC	Environmental Protection and Biodiversity Conservation)
EPC	Exploration Permits Coal
EPCM	Engineering, Procurement and Construction Management
EPM	Exploration Permits Minerals
EPP	Exploration Permits Petroleum

EPP	Environmental Protection Policy
ERA	Environmentally Relevant Activities
ESA	Equivalent Standard Axels
ESD	Ecologically Sustainable Development
ESP	Exchangeable Sodium Percentage
EV	Environmental Values
FBA	Fitzroy Basin Association
FHA	Fish habitat area
FIFO	Fly in/Fly out
FRCP	Fatal Risk Control Protocols
FTE	Full-time employees
g/m²/month	grams per metre squared per month
GBRWHA	Great Barrier Reef World Heritage Area
GDE	Groundwater Dependent Ecosystems
GHG	Greenhouse Gas
GIS	Global information system
GPS	Global positioning system
GQAL	Good Quality Agricultural Land
ha	Hectares
HAZOP	Hazard and operability
HDPE	High Density Polyethylene
HIL	Health-based Investigation Level
HSEC	Health, Safety, Environment and Community
IPA	*Integrated Planning Act 1997*
IPCC	Intergovernmental Panel on Climate Change
IRC	Issac Regional Council
IRR	Internal Rate of Return
IRTM	Interactive Resource and Tenure Map
JAMBA	Japan-Australia Migratory Bird Agreement
K	Potassium
km	Kilometre

km²	Square kilometres
KPI	Key Performance Indicator
kV	Kilovolts
L/S	Litres/second
LFA	Landscape Function Analysis
LGA	Local Government Area
L10 (dBA)	Noise level (in decibels – A weighted) exceeded for 10% of the measurement period
L90 (dBA)	Noise level (in decibels – A weighted) exceeded for 90% of the measurement period
LAeq(1hour)	Equivalent continuous (or 'average') noise level (in decibels – A weighted) over a 1 hour measurement period
LAmax	Maximum noise level
Leq (dBA)	Equivalent continuous (or 'average') noise level (in decibels – A weighted)
LOM	Life of the Mine
LOS	Level of Service
LOX	Limit of Oxidation
LP Act	Queensland Lands Protection (Pests and Stock Route Management) Act 2002
m	Metre
m/day	Metres per day
m^3/h	Cubic metres per hour
Ma	Manganese
Mbcm	Million bulk cubic metres
mbgl	Metres below ground level
MDL	Mining Development Lease
MDLA	Mining Development Lease Application
MDPE	Medium Density Polyethylene
MDSS	Moranbah and District Support Services
Mg	Magnesium
mg/L	Milligram/litre
MGC	Mitsubishi Gas Company

MIA	Mining industrial area
ML	Mining Lease
ML/year	Mega litres per year
MLA	Mining Lease Application
Mlpa	Mega litres per annum
mm	Millimetres
mm^2	Square millimetres
mm^3	Cubic millimetres
MNES	Matters of National Environmental Significance
MP	Minister of Parliament
MPA	Maximum Potential Acidity
MRA	Mineral Resources Act 1999
MSDS	Material Safety Data Sheets
Mt	Million tonnes
Mt/a	Million tonnes per annum
Mtpa	Million tonnes per annum
MWTP	Moranbah Water Treatment Plant
N	Nitrogen
N_20	Nitrous oxide
NAF	Non Acid Forming
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NGA	National Greenhouse Accounts
NGER	National Greenhouse and Energy Reporting
NHMRC	National Health and Medical Research Council
NO_2	Nitrogen Dioxide
NPI	National Pollutant Inventory
NPV	Net Present Value
NRA	Natural Resource Assessments
NRW	Queensland Department of Natural Resources and Water
NSW	New South Wales

NTU	Nephelometric Turbidity Units
OH&S	Occupational Health and Safety
PAF	Potentially Acid Forming
pH	Measure of acidity
PHA	Preliminary hazard analysis
PIFU	Planning Information and Forecasting Unit
pm	Post meridiem (time between noon and midnight)
PM_{10}	Particles with an aerodynamic diameter of less than 10 µm
$PM_{2.5}$	Particles with an aerodynamic diameter of less than 2.5 µm
PSI	Preliminary Site Investigation
PVS	Peak Vector Sum
QAS	Queensland Ambulance Services
QFRS	Queensland Fire and Rescue Service
QMEA	Queensland Minerals and Energy Academy
QR	Queensland Rail
QRC	Queensland Resources Council
QWQG	Queensland Water Quality Guidelines
RAMSAR	Convention on Wetlands (singed in Ramsar)
RBL	Rating Background Level
RE	Regional Ecosystem
REDC	Regional Economic Development Corporation
REM	Rapid Eye Movement
RIP	Roads Implementation Program
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
ROM	Run-of-mine
ROP	Resource operating plan
SEIFA	Socio-economic Index for Areas
SES	State Emergency Services
SIA	Social Impact Assessment
SIGNAL	Sampling and associated stream health
SIP	Social Impact Plan

SL	Special Lease
SO_2	Sulphur Dioxide
SPP	State Planning Policies
SPQ	Single Person Quarter/s
STP	Sewage treatment plant
t	Tonne
TDS	Totally Dissolved Solids
TLO	Train load out
ToR	Terms of Reference
TPH	Total petrol hydrocarbons
tph	Tonnes per hour
TSP	Total suspended particulates
TSS	Total suspended solids
UDC	Utah Development Corporation
ULP	Unleaded Petrol
µm	micrometres
µg/m³	micrograms per metre cubed
Visibility	extent to which the development will be visible
vkt	Vehicle Kilometres Travelled
VM Act	Vegetation Management Act 1999
VS	View Situations
WHAM	Whitsunday Hinterland and Mackay
WHO	World Health Organisation
WMP	Waste Management Plan
WRP	Water Resource Plan
WTP	Water treatment plant