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## GLOSSARY AND ABBREVIATIONS

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SUPPLEMENTARY REPORT TO THE EIS

## Section 18 Glossary, Abbreviations and Units

# 18 Glossary, Abbreviations and Units

## 18.1 Glossary

Term	Definition
Abatement measure	Suppression or termination measure
Adsorption	Adsorption is the adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to a surface
Airshed	Volume of air confined to a distinct geographic region and within which pollutants are contained
Alluvial	Pertaining to alluvium
Alluvium	Unconsolidated deposits of inorganic materials (clay, silt, sand, gravel, boulders) deposited by flowing water
Ambient air quality	The state of quality and chemical characteristics of air as it exists in the environment
Anaerobic	Of or pertaining to biology and physiology (of organisms or tissues) requiring the absence of free oxygen or not destroyed by its absence; relating to or caused by the absence of oxygen, e.g., anaerobic decomposition
Annual average daily traffic (AADT)	The average traffic volume expected over a 24-hour period in a given year
Aquifer	Rock or sediment in a formation, group of formations, or part of a formation that is saturated and sufficiently permeable to allow water to percolate through
Aquitard	Low-permeability aquifer
Area of disturbance	The area in which physical displacement of existing features occurs, leading to potential impacts
Arrow Bowen Pipeline	A proposed 580 km long, high-pressure, gas transmission pipeline consisting of a main pipeline and several lateral pipelines to convey coal seam gas (CSG) from Arrow's gas fields in the Bowen Basin to Gladstone for eventual export as liquefied natural gas
Arrow LNG Plant	A large-scale (up to 18 mtpa, nominally 16 mtpa) liquefied natural gas facility that Arrow CSG (Australia) Pty Ltd proposes to develop on Curtis Island near Gladstone, Queensland
Associated water	Underground water necessarily or unavoidably taken or interfered with during the drilling of a petroleum well (as defined by the <i>Petroleum and Gas (Production and Safety Act 2004 (P&amp;G Act))</i> )
AUSPLUME	Plume dispersion model
Authority to prospect	Tenure allowing the holder to undertake gas exploration activities and studies to evaluate the development potential of a defined resource
Avifauna	Birds of a given region
Background noise level	The noise level in the absence of intermittent noise sources
Basalt	The dark, fine-grained igneous rock of a lava flow, composed essentially of plagioclase and pyroxene, and sometimes displaying a columnar structure
Baseflow	Surface water flow in a watercourse sustained by groundwater discharge

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Term	Definition
Baseline	A basic standard or level, usually regarded as a reference point for comparison
Bedding plane	A distinct surface of contact between two sedimentary rock layers
Beneficial use	An alternative use for a material, such as CSG water or salt, which changes the status of the material from a waste to a resource that can be used for a beneficial purpose
Biodegradation	The chemical dissolution of materials by bacteria or other biological means
Biodiversity	The variety of species of plants, animals and microorganisms, their genes, and the ecosystems they comprise, often considered in relation to a particular area
Biogenic	Produced by living organisms or biological processes
Bioregion	Relatively large land area characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems and capture the large-scale geophysical pattern of the area. These patterns in the landscape are linked to fauna and flora assemblages and processes at the ecosystem scale, thus providing a useful means for simplifying and reporting on more complex patterns of biodiversity
Bore	A hole drilled in the ground to obtain samples of soil or rock, intersect groundwater for extractive use, monitoring or investigation, or for a range of other purposes. In Australia is also a commonly used term for a constructed groundwater well
Borrow pit	A pit created to provide soil, gravel or rocks that can be used as fill at another site
Breccia	A rock type characterised by coarse grained rock fragments held together in a fine grained matrix. Commonly produced by rock fracturing during faulting or deformation
Brine	Water that contains more than 35,000 mg/L of dissolved solids; the waste product of reverse osmosis water treatment
Brine dam	An impoundment constructed at an IPF to store the brine produced by water treatment facilities prior to its disposal
Cainozoic	Relating to the geological era of rocks of most recent age (65.5 million years ago to present)
Carbon monoxide	Toxic, colourless, odourless gas produced by burning any fuel
Catchment	An area which discharges to a common point
Category A environmentally sensitive area	Any area designated as national park under the <i>Nature Conservation Act 1999</i> (Qld), as well as conservation parks, forest reserves, and the Wet Tropics World Heritage areas
Central gas processing facility (CGPF)	A production facility that receives gas from field compression facilities and production wells, and compresses it to export pipeline pressure
Cleat	A natural fracture within a coal bed; cleats account for most of the permeability and much of the porosity of coal-bed gas reservoirs
Coal	A black or brown carbon-based sedimentary rock formed by the accumulation and decomposition of plant material in layers and used as fuel; main types are hard coal (anthracite), soft coal (bituminous coal), and brown coal (lignite)
Coal seam gas (CSG)	A form of natural gas extracted from coal beds
Combustion	The act of processing or burning
Competent formations	Rock types that are strong and able to transmit compressive forces. The thickness of a component rock formation does not change when under stress (compare elastic properties)
Compressibility	A measure of the relative volume change of a fluid or solid in response to a change in pressure or stress

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Term	Definition
Conceptual project design	Proposed project design timeframes for gas field and facility development established for the purpose of environmental impact assessment
Confined aquifer	An aquifer bounded above and below by impervious layers' in a confined aquifer, the water is under sufficient pressure to cause it to rise above the top of the aquifer if given the opportunity
Confining layer	Geological material through which significant quantities of groundwater cannot move. Confining layers are located below unconfined aquifers, and both above and below confined aquifers
Constraints mapping	One of the items comprising the framework (see framework)
Contaminant	A contaminant is something that is normally absent in the local environment which, if released in sufficient concentration, can adversely affect living organisms through air, water, soils and/or food. A contaminant can be: (a) a gas, liquid or solid; (b) an odour; (c) an organism (whether alive or dead), including a virus; (d) energy, including noise, heat, radioactivity and electromagnetic radiation; or (e) a combination of contaminants
Contamination	The release (whether by act or omission) of a contaminant into the environment
Contour plot	A graphical technique for representing a three-dimensional surface by plotting contours on a two-dimensional format
Cretaceous	Relating to the geological era of rocks formed between 145 and 65 million years ago
Crustal structure	Geological features in the Earth's outer-most layer (e.g. faults and folds)
Crystallising magma	The development of solid crystals in magma (molten rock) as it cools
CSG water	Underground water which is extracted through the process of exploring for or producing CSG under a petroleum authority
Cumulative effect	The combined impact to one or more environmental values delivered by multiple projects being undertaken within one physical area
Damage zone	The area of rock around a fault that has undergone alteration as a result of the faulting activity
Deformation	A geological process in which the application of a force causes a change in geometry, such as the production of a fold, fault or fabric, often associated with metamorphic reactions
Demography	The science of vital and social statistics, as of the births, deaths, diseases, marriages, etc. of populations; the range of different groups existing in a particular populace, as distinguished by factors such as age, ethnicity, social background, etc
Depressurisation	The lowering of the groundwater elevations over an area
Development region	Physical areas into which the Project area has been divided for the purposes of phasing the Project <ul style="list-style-type: none"> <li>• 14 development regions were presented in the EIS</li> <li>• 9 development regions presented in the SREIS</li> </ul>
Dewatering	The draining, permanently or temporarily, of water flowing over or groundwater underneath a wet area of land, for agriculture, construction, etc
Directional drilling	The technique of drilling non-vertical or horizontal wells by intentionally deviating a wellbore from the path it would naturally take

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Term	Definition
Dissolved solids	Soluble compounds such as salts which are in solution.
Disturbance	A physical displacement of existing features that leads to impacts
Drawdown	The distance that the groundwater level in a bore or within a water table is lowered from the standing water level when influenced by pumping; the act of lowering the groundwater level
Drilling rig	A machine that created holes (usually called boreholes) or shafts in the ground
Ductile deformation	Behaviour where rocks, at a critical stress, become permanently deformed by bending or flowing
Easement	A legal term used to describe land over which a third-party has rights to locate infrastructure and undertake certain activities
Ecology	The branch of biology that deals with the relations between organisms and their environment
Ecosystem	A community of organisms interacting with one another and with the environment in which they live (i.e., a pond or forest, etc.)
Edge effect	The degree to which adjacent habitats influence each other or interact, Commonly used in conjunction with the boundary between natural habitats, especially forests, and disturbed or developed land. Edge effects are especially pronounced in small habitat fragments where they may extend throughout the patch
Elastic Properties	The tendency of a rock to deform (e.g. fold or flow) in various directions when stress is applied. The deformation dissipates when the stress is removed (compare competent formations)
Electrical conductivity	The measure of a material's ability to accommodate the transport of an electric charge
Encroachment	The act of advancing beyond proper limits; making gradual inroads
Endangered	Of or relating to a plant, animal or ecosystem the population size of which has declined or is likely to decline to the extent that the wildlife may be threatened by extinction
Endemic	(Of a plant or animal) native to a country or locality, although also found elsewhere
Environmental authority	The primary statutory document, issued in accordance with the <i>Environmental Protection Act 1994</i> (EP Act) that sets conditions on authorised petroleum activities that will be used by the Department of Environment and Heritage Protection (EHP) to assess and administer regulatory environmental compliance
Environmental impact statement	A structured document that is prepared to identify and assess the environmental impacts of a proposed activity and to outline safeguards to mitigate or control such impacts
Environmental management plan	A document that provides operational detail of how environmental management measures identified in the EIS will be implemented
Environmental offsetting	The replacement of a destroyed habitat or ecosystem with an ecological equivalent
Environmental values	Desirable characteristics, properties or ecosystem with an ecological equivalent
Environmentally Relevant Activity	A mining activity or another activity defined under section 19 of the EP Act
Environmentally sensitive area	A location, however large or small, that has environmental values that contribute to maintaining biological diversity and integrity, has intrinsic or attributed scientific, historical or cultural heritage value; or is important in providing amenity, harmony or sense of community
Ephemeral	Of or pertaining to a water body that exists for a limited period following precipitation

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Term	Definition
Erosion	The wearing away of rock or soil caused by physical or chemical processes
Essential habitat	For species of wildlife listed as endangered, vulnerable, rare, or near threatened under the <i>Nature Conservation Act 1992</i> , and area of vegetation shown on the regional ecosystem map or remnant map as remnant vegetation a) that has at least three essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or b) in which the protected wildlife, at any stage of its life cycle, is located. Essential habitat areas are identified on a map certified by the chief executive of EHP for the purposes of the <i>Vegetation Management Act 1999</i> (Qld)
Exploration	The activities conducted across the Project area to identify and define the gas resource
Extractive resources	Materials such as sand, gravel, soil, rock and other similar materials that are quarried or extracted from the earth
Fault	A fracture in the Earth's crust that occurs when shear stress on a rock overcomes the forces which hold it together. The fracture itself is called a fault plane
Fauna	The animals of a given region or period, taken collectively
Field compression facility	A remotely operated installation comprising one or more first-stage compression trains and a power source sited between wells and a central gas processing facility in an area where wellhead pressure is insufficient to transport the gas from the field to the processing facility
Flare	To burn excess gas from a petroleum activity
Flora	The plants of a given region or period, taken collectively
Fluvial	Pertaining to a river or stream
Fluvial geomorphology	The study of river-related landforms and the processes that shape them
Flux	The rate of flow (mass transport) of a fluid or other material or compound transported by that fluid.
Footprint	See area of disturbance
Formation	In geology, a sequence of rock layers that have similar properties
Fossil fuel	A hydrocarbon deposit, such as petroleum, coal or natural gas, derived from living matter of a previous geologic time and used for fuel
Framework	A tool used by Arrow to inform site selection and manage the potential impacts of development, wherever the infrastructure is ultimately located, comprised of constraints maps and environmental controls
Fugitive emission	An emission of gases or vapours from pressurised equipment due to leaks and various other unintended or irregular releases of gases, mostly from industrial activities
Gathering infrastructure	Small-diameter pipelines through which either CSG or water moves on a petroleum lease from the wellhead to the production facility
Geographical information system	A computer system that can capture, store, analyse, and present in various ways data that located places on the earth's surface
Geomorphology	The branch of geology dealing with the characteristics, origin, and development of land forms
Global warming	An increase in the Earth's average surface temperature that causes corresponding changes in climate and may result from the greenhouse effect
Goaf	That part of a mine from which the mineral has been partially or wholly removed; the waste left in old workings

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Term	Definition
Good quality agricultural land	Agricultural land of high quality, as defined under State Planning Policy 1/92
Greenhouse Gas Protocol	A set of corporate accounting and reporting standards for greenhouse gas emissions developed by the World Business Council
Ground truthing	The process of sending technicians to gather data in the field that either complements or disputes remote sensing data collected by aerial photography, satellite images, or infrared images
Groundwater	Subsurface water, generally saturating the soil or rock in which it occurs
Groundwater flows	The movement of water in an aquifer
Habitat fragmentation	The alteration of an organisms habitat resulting in spatial separation of habitat units from a previous state of greater continuity
Hazardous material	A substance that, if improperly treated, stored, disposed of, or otherwise managed, is likely to cause serious or material environmental harm because of (a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity, or flammability; or (b) its physical, chemical or infectious characteristics
Heavy vehicle	Any vehicle with three or more axles or with dual tyres on the rear axle
High bank	The terrace or bank or point on the active floodplain that confines the average annual peak flow
Highway	A high-order road of a high standard, facilitating connectivity between regional centres
Hydraulic conductivity	The rate at which water can move through a permeable medium
Hydraulic gradient	The slope of the watertable in an unconfined aquifer, or the potentiometric surface in a confined aquifer
Hydraulic head	A measure of the pressure of water in an aquifer, commonly measured as the elevation to which groundwater will rise in a constructed well. Differences in these elevations determine the hydraulic gradient and therefore the direction of groundwater flow
Hydraulic stimulation	The propagation of fractures in a rock layer caused by the presence of a pressurised fluid
Hydrogeology	The study of the inter-relationships of geologic materials and processes with water, especially groundwater
Hydrostatic testing	The process in which a pipeline is filled with water and subjected to higher than normal operational pressures to test its physical integrity (also referred to as hydro-testing)
Hydrotest water	Water used for hydrostatic testing
Hydrothermal alteration	Alteration of minerals or rocks by the action of superheated mineral-rich fluids, usually water that has been heated to very high temperatures within a crystallizing magma
Igneous intrusion	An igneous rock body that formed from magma that forced its way into, through or between subsurface rock units
Igneous rock	Rock formed from magma or lava that has cooled and solidified either at the earth's surface (volcanic rock) or deep within the earth's crust (plutonic rock)
Impact	An event that disrupts ecosystem, community, or population structure and alters the physical environment, directly or indirectly
Induced hydraulic fracture	See hydraulic stimulation
Infiltration	The downward movement of water from the atmosphere into the ground

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Term	Definition
Integrated processing facility (IPF)	A production facility that receives gas from field compression facilities and production wells, and compresses it to export pipeline pressure
Inter-bedded	Have beds lying between other beds with different characteristics
Interburden	Material of any nature that lies between two or more bedded ore zones or coal seams
Jurassic	Relating to the geological era of rocks formed between 200 and 145 million years ago
Lacustrine	Of or relating to a lake
Lake	A permanent or ephemeral natural or artificial body of water of considerable size surrounded by land
Landholder	The owner, occupier, manager, or controller of land or water, including anyone acting on their behalf
Landowner	The registered proprietor or person having a registrable interest in land
Lenses	Rock units or sediment bodies that are thick in the middle and thin towards the edges. They are laterally discontinuous.
Licensed waste disposal facility	A facility approved under a development approval and operated by a holder of a registered certificate for environmentally relevant activity 75 under Schedule 1 of the Environmental Protection Regulation 1998
Light vehicle	A car or four wheel drive, motorcycle or car towing a caravan
Lineament	A regional topographic feature that is believed to reflect crustal structure
Liquefied natural gas (LNG)	A gas consisting primarily of methane, liquefied to facilitate transport and storage
Lithology	The physical composition of a rock
Macroinvertebrate	An animal that has no backbone and is visible without magnification
Macrophyte	An aquatic plant that grows in or near water and is either emergent, submergent or floating
Matters of national environmental significance	Listed under the EPBC Act; MNES are listed threatened species and ecological communities, migratory species protected under international agreements, Ramsar wetlands of international importance, the Commonwealth marine environment, World Heritage properties, National Heritage places, the Great Barrier Reef Marine Park, and nuclear actions
Metamorphic reactions	The chemical reactions that occur during the formation of a metamorphic rock. Metamorphic rocks are formed when existing rocks are recrystallised in response to changes in pressure and or temperature
Meteorological	Relating to meteorology or to phenomena of the atmosphere or weather
Microseismic	A vibration in the earth that is unrelated to an earthquake. It may be produced by other natural activity (wind, waves etc) or human activity
Migratory species	A species that passes periodically from one region to another
Mitigation	To lessen in force or intensity; to moderate the severity of (anything distressing)
Modelling	The creation of a computerised model of what might happen in the future
Mudstone	A clayey rock of nearly uniform texture throughout, with little or no lamination
Municipal	Relating to the internal affairs of a single nation rather than to international affairs
Native title	In Australia, the right to land or water enjoyed by indigenous people who have maintained their connection to said land or water and whose possession under traditional law or customs is recognised by Australian law; established by the <i>Native Title Act 1993</i> , which followed the Mabo decision of 1992

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Term	Definition
Natural resource	A resource that occurs naturally, such as sunlight, wind, soil or water
Nitrogen dioxide	An air pollutant; high concentrations of which can contribute to acid rain, eutrophication of watercourses and formation of photochemical smog
Outcrop	An exposure of bedrock
Oxidation	The addition of oxygen to a compound
Palustrine	Of, or relating to, or lining in a wetland or swampy area
Particulate matter	Dust particles that are introduced or resuspended into the air through certain activities, such as soil cultivation or vehicles operating on open fields or dirt roadways
Perched aquifer	An unconfined aquifer of limited extent located above the true watertable
Permeability	The ease with which a fluid can pass through a porous medium, such as an aquifer. It is expressed in metres per day
Permian	Relating to the geological era of rocks formed between 300 and 250 million years ago
Pest	An organism considered harmful
Petroleum activity	As defined in the EP Act: a) activities that, under the <i>Petroleum Act 1923</i> , are authorised activities for a petroleum tenure under that act; b) activities that, under the P&G Act, are authorised activities for a petroleum authority under that act; c) exploring for, exploiting or conveying petroleum resources under a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the <i>Petroleum (Submerged Lands) Act 1982</i> ; d) rehabilitating or remediating environmental harm because of activities mentioned in paragraphs (a) to (c); e) actions taken to prevent environmental harm because of activities mentioned in paragraphs (a) to (d); f) activities required under a condition of an environmental authority for activities mentioned in paragraphs (a) to (e); or g) activities required under a condition of an environmental authority mentioned in paragraphs (a) to (e) that has ended or ceases to have effect, if the condition (i) continues to apply after the authority has ended or ceases to have effect, and (ii) has not been complied with
Petroleum authority	A right granted under the <i>Petroleum Act 1923</i> or P&G Act to allow a proponent to explore for or develop the state's petroleum resources; the types of authorities that may be granted under these acts include authority to prospect, petroleum lease, data acquisition authority, water monitoring authority, petroleum facility licence, survey licence, and pipeline licence
Petroleum lease	See petroleum authority
Petroleum tenure	A right granted under the <i>Petroleum Act 1923</i> or P&G Act to allow a proponent to explore for or develop the state's petroleum resources; the types of authorities that may be granted under these acts include authority to prospect, petroleum lease, data acquisition authority, water monitoring authority, petroleum facility licence, survey licence and pipeline licence
pH	The absolute value of the decimal logarithm of the hydrogen-ion concentration (activity), used as an indicator of acidity (pH less than 7) or alkalinity (pH greater than 7) or neutrality (pH 7)
Photochemical	Of, or relating to, or produced by the action of light triggering chemical process
Piper plot	A graphical representation of the chemistry of a water sample or samples

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Term	Definition
Pollution	The introduction into the environment of an substance or factor by the action of humans that is or results in harmful effects to humans or the environment
Porosity	The state or quality of being porous; determined by the proportion or openings or pores
Preferential flow	The movement of groundwater through more permeable zones in the subsurface
Produced water	<i>See associated water</i>
Production facility	A field compression facility or CGPF
Production well	A well producing CSG
Project area	The area for which Arrow is seeking approval to develop through the EIS assessment process; it comprises an approximate 8,000 km <sup>2</sup> area extending from Glenden in the north to Middlemount in the south
Project life	The total duration of the construction, operation and decommissioning phases of the Project used in this assessment
Project	A collaborative enterprise, often involving research or design, carefully planned to achieve a particular aim
Proppant	A proppant is a solid material, typically treated sand or man-made ceramic materials, designed to keep an induced hydraulic fracture open, during or following a hydraulic stimulation treatment
Putrescible waste	Refuse or other discarded material that is liable to become putrid or rotten through decay or decomposition
Qualitative	Relating to or concerned with quality or qualities
Quantitative	Of or pertaining to an assessment based on the amount or number of something
Quaternary	Of or designating the time period beginning approximately 2 to 3 million years ago, extending to the present; this time period encompasses the Pleistocene and Holocene epochs
Ramp down	Decreasing gas production when the end user decommissions some or all of its facility
Ramp up	Increasing gas production (through early stages of drilling) until overall required gas production rate for the end user is reached
Raw water	Untreated water from the environment
Recharge area or zone	A land area in which water reaches the zone of saturation via surface infiltration, e.g., a place where rainwater soaks through the earth to reach an aquifer
Recharge	The process by which water is added to the zone of saturation of an aquifer from the outside, either directly into a formation or indirectly by way of another formation
Recovery	A rise of the water level in a bore or an aquifer after the pumping rate has been reduced, the pump has been shut off, or petroleum activities have ceased
Regional connecting road	A high-order road of a high standard, facilitating connectivity between townships
Regional ecosystem	The relationships between major floral species and the environment at the regional scale; regional ecosystems are mostly derived by linking vegetation mapping units based on dominant canopy species (those recognisable at a scale of 1:100,000) to land zones that represent major environmental variables, in particular, geology, rainfall and landform; under the <i>Vegetation Management Act 1999</i> , each regional ecosystem is assigned a conservation status based on an assessment of the pre-clearing and remnant extent of that regional ecosystem
Regulated waste	Refuse or other discarded material listed in Schedule 7 of the Environment Protection (Waste Management) Regulation 1998 (whether treated or immobilised)

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Term	Definition
Regulatory framework	A system of regulations and the means to enforce them, usually established by a government to regulate a specific activity
Rehabilitation	The process of restoring an aspect of the environment to former condition
Release	To deposit, discharge, emit, or disturb a contaminant; to cause or allow a contaminant to be deposited, discharged, emitted, or disturbed; to fail to prevent a contaminant from being deposited, discharged, emitted, or disturbed; or to fail to prevent the contaminant from escaping
Remediation	The restoration of an environment to an improved condition, in keeping with its original state prior to impact, via the removal of pollutants and contaminants
Remnant vegetation	Under the <i>Vegetation Management Act 1999</i> , an aggregation of native vegetation in which the predominant canopy of the vegetation covers more than 50% of the equivalent undisturbed canopy, averages more than 70% of the vegetation's undisturbed height, and is composed of species characteristic of the vegetation's undisturbed canopy
Representative	Exemplifying a class; typical
Reserve	The portion of an identified coal resource that can be economically mined at the time of determination
Residual impact	The effect remaining or left over following application of mitigation measures
Reverse osmosis	A water-purifying technique by which fluid moves under pressure through a semipermeable membrane from a high solute concentration to a lesser concentration
Right of way	The linear area within which a pipeline, road or railway is constructed
Riparian	Of, or relating to, or situated or dwelling on the bank of a river or other body of water
Riverine	Of or relating to a river
Runoff	Water flow that occurs when the soil is infiltrated to full capacity and excess water from rain or irrigation flows over the land surface into watercourses or other surface waters, or land depressions
Saline water	Water that is generally considered unsuitable for human consumption or for irrigation because of its high content of dissolved solids
Salinity	Salinity is the saltiness or dissolved salt content (such as sodium chloride, magnesium and calcium sulfates, and bicarbonates) of a body of water or in soil
Sandstone	A rock formed by the consolidation of sand, the grains being held together by a cement of silica, lime, gypsum or iron salts
Scope 1 greenhouse gas emission	Direct greenhouse gas emission, from turbines, vehicles or other equipment owned and operated by the company, including conducting a greenhouse gas inventory
Scope 2 greenhouse gas emission	A greenhouse gas emission resulting from the use of electricity or other utilities provided by a third party
Scope 3 greenhouse gas emission	An indirect greenhouse gas emission produced as a result of a company's activities but from sources not owned or operated by that company, e.g., emissions from transport, end use or raw material supply
Sediment	Unconsolidated geological material which has been formed by a process of deposition as discrete particles
Sediment mobilisation	The process of dislodgement and movement of sediment by rainfall, runoff and flowing water
Sedimentation	The deposition or accumulation of mineral or organic matter deposited by water, air or ice

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Term	Definition
Seismic activity	An earthquake or motion in the Earth's crust
Sensitive receptor	An area or structure sensitive to a predicted environmental impact (usually from air emissions or noise), such as a dwelling (excluding dwellings owned by Arrow and that will be unoccupied at the time of operations); a library, childcare centre, kindergarten, school, college, university or other educational institution; a hospital, surgery or other medical institution; a protected area or an area identified under a conservation plan as a critical habitat or an area of major interest under the <i>Nature Conservation Act 1992</i> ; a marine park under the <i>Marine Parks Act 2004</i> ; or a park or garden that is open to the public
Shale	A fine grained sedimentary rock formed by the compaction of silt or clay
Siltstone	Consolidated silt; a fine-grained sandstone
Simultaneous	Existing, occurring or operating at the same time
Social impact management plan (SIMP)	A document that details how social impact management recommendations will be implemented
Soda ash	A compound of sodium, Sodium Carbonate ( $\text{NaCO}_3$ ) occurring in an anhydrous form as a white powder
Soil profile	A vertical section through all the constituent soil horizons
Spring	The land to which water rises naturally from below the ground and the land over which the water then flows
Stable	Of or pertaining to the geotechnical steadiness of a rehabilitated landform where unsteadiness related to the excessive settlement and subsidence caused by consolidation or settlement of the waste deposited, as well as sliding or slumping unsteadiness, has ceased
Stakeholder	A person or group affected by or concerned with an issue or enterprise
State-controlled road	A road declared to be a controlled road by the Department of Transport and Main Roads, including all AusLink national roads in Queensland
Statutory guideline	A written document under a legislative authority that commands or prohibits something or declares policy
Stock route network	The network of facilities established to facilitate the movement of livestock on foot between grazing areas and markets consisting of areas for stock to travel along (often within existing road corridors, adjacent to roadways) and areas for livestock to rest overnight, as well as watering facilities and holidaying yards
Stockpile	A large supply of essential materials, held in reserve for later use
Strata	A single bed of sedimentary rock, generally consisting of one kind of matter representing continuous deposition
Strategic cropping land (SCL)	Strategic cropping land (SCL) is an important, finite resource that is subject to competing land uses from the agriculture, mining and urban development sectors
Stratigraphy	A branch of geology dealing with the classification, nomenclature, correlation and interpretation of stratified rocks
Stress direction (or stress orientation)	The direction in which a force is acting upon or within a mass or rock, expressed in terms of unit weight per surface area such as tons per square inch
Stress field	A region where stress is defined at every point
Stress regime	The relative stress magnitudes in the horizontal and vertical direction, resulting in either a compressive or extensional tectonic state
Subcrop	The location where a geological formation would outcrop at the surface if the top-most formation or alluvial deposits were removed

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Term	Definition
Subsidence	The downward settling or sinking of the Earth's surface with little or no horizontal motion
Subsoil	The B horizon within the soil profile, which lies immediately below the topsoil, or A horizon; it is not enriched or is less enriched with organic material than the topsoil and may be subject to clay or salt accumulation
Sulfur dioxide	A toxic gas found in the emissions of volcanoes and those burning coal or petroleum; it dissolves in water to form sulfurous acid and, in the presence of oxygen, sulfuric acid
Technical specialists	Persons qualified in a particular area of expertise and engaged to undertake assessments as part of the EIS
Temporal scale	Of, or relating to a time scale
Terms of reference (ToR)	A written document developed by the regulatory authority (i.e. EHP) that provides the minimum expectations for the scope of an EIS
Terrestrial	<ol style="list-style-type: none"> <li>1. Relating to, consisting of, or representing the Earth</li> <li>2. Of or relating to the land as distinct from the water</li> </ol>
Tertiary	Relating to the geological era of rocks formed between 65 and 2 million years ago
The air pollution model	A three-dimensional prognostic meteorological model developed by CSIRO and used for air pollution modelling
Thematic category	Information designed to show a particular topic connected with a specific geographic area
Thematic mapping	Maps showing the distribution of thematic categories
Thermal	Heat, generated by the internal motion of charged particles in matter
Threatened	Said of flora and fauna species – having uncertain chance of continued survival owing to habitat disturbance or modification
Topography	The detailed description and analysis of the features of a defined area, district or locality
Total dissolved solids	A measure of the concentration of total dissolved inorganic and organic substances in a liquid
Transmission pipeline	A pipeline that transports gas (particularly from an integrated processing facility or central gas processing facility to an export pipeline or another integrated processing facility)
Treated water dam	An impoundment constructed at an IPF to store treated CSG water received from a water treatment facility prior to distribution for beneficial use
Triassic	Of, or relating to, or denoting the earliest period of the Mesozoic era, between the Permian and Jurassic periods
Turbid	(of liquids) opaque or muddy with particles of extraneous matter
Uncertainty analysis	The numerical investigation of a groundwater model to understand the range of potential outcomes that could be predicted by the model when parameters and assumptions are varied. The analysis results in an estimation of the probability of an event occurring (e.g. the probability that groundwater drawdown will exceed a certain value)
Unconfined aquifer	Saturated rock or sediment with no confining layer between the water table and the ground surface where the water table is free to fluctuate
Unmitigated	Without mitigation measures in place
Uplift	The relative upward movement of rocks due to tectonic forces
Upset conditions (flaring)	Unexpected circumstances, such as an emergency plant shutdown for equipment maintenance, that requires gas to be flared

## Section 18 Glossary, Abbreviations and Units

Term	Definition
Venting (gas)	The direct release of gas from a pipeline or from equipment
Water transfer station	A facility located at a production facility and comprising a water transfer dam and pumping station used to manage the water received from pipelines and directly from wells
Water treatment facility	An installation that typically employs filtration and reverse osmosis techniques to purify water with a high solute concentration to a lesser concentration; may also include balancing to ensure that the water is suitable for beneficial end uses
Watercourse	A watercourse is a river, creek or stream in which water flows permanently or intermittently: a) in a natural channel, whether artificially improved or not; or b) in an artificial channel that has changed the course of the watercourse. A watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water
Watertable	The surface in an unconfined aquifer or confining bed at which the pore water pressure is atmospheric; it can be measured by installing shallow wells extending a few feet into the zone of saturation and then measuring the water level in those wells
Well completion	The activities and methods for preparing a well for the production of gas, including the method by which one or more flow paths for hydrocarbons are established between the coal and the surface
Wellhead	The component at the surface of an oil or gas well that provides the interface for drilling and production equipment
Wellpad	The base upon which a well is constructed
Wild river area	A part of the state of Queensland declared as a wild river area under the Wild Rivers Act 2005. Wild river areas may include high preservation areas, preservation areas, floodplain management areas, and sub-artesian management areas
Wildlife corridor	A habitat linked to other habitats (often remnant patches) to allow natural migration or movement of wildlife
Workover	Re-entry into a completed field well for modification or repair. Restoring well productivity by cleaning out accumulations of sand, silt or other substances that clog production tubing, or other maintenance activities
[B001]	Each mitigation and management measure has been identified consistently throughout the EIS with a unique identifier (e.g. [B001]) to facilitate cross referencing

## Section 18 Glossary, Abbreviations and Units

### 18.2 Abbreviations

Abbreviation	Definition
AADT	annual average daily traffic
ACA	Aquatic Conservation Assessment
AEP	annual exceedance probability
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
API	American Petroleum Institute
APIA	Australian Pipeline Industry Association
AquaBAMM	Aquatic Biodiversity Assessment and Mapping
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
Arrow	Arrow Energy Pty Ltd
AS	Australian Standard
ATP	Authority to Prospect
ATPA	Authority to Prospect Applications
AusRivAS	Australian Rivers Assessment System
BMA	BHP Billiton Mitsubishi Alliance
BOM	Bureau of Meteorology
CAS	Chemical Abstract Service
CDM Smith	CDM Smith Australia Pty Ltd
CGPF	central gas processing facility
CH <sub>4</sub>	methane
CHMP	cultural heritage management plan
CMA	cumulative management area
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
COB	Central Operating Base
Coffey	Coffey Environments Australia Pty Ltd
CPM	Carbon Pricing Mechanism
CQRP	Central Queensland Regional Plan
CSG	coal seam gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cwlth	Commonwealth
DEEDI	Department of Employment, Economic Development and Innovation (Queensland) (obsolete: now Department of State Development, Infrastructure and Planning)
DERM	Department of Environment and Resource Management (Queensland) (obsolete: now Department of Environment and Heritage Protection)
DEWS	Department of Energy and Water Supply
DIDO	drive in/ drive out
DSDIP	Department of State Development, Infrastructure and Planning

## Section 18 Glossary, Abbreviations and Units

Abbreviation	Definition
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth) (now Department of the Environment)
EA	environmental authority
EC	electrical conductivity
EEO	Energy Efficiency Opportunities
EEO Act	<i>Energy Efficiency Opportunities Act 2006</i> (Queensland)
EHP	Department of Environment and Heritage Protection (Qld)
EIS	environmental impact statement
EM Plan	environmental management plan
EP (Waste Management) Regulation	<i>Environmental Protection (Waste Management) Regulation 2000</i> (Queensland)
EP Act	<i>Environmental Protection Act 1994</i> (Queensland)
EP Regulation	Environment Protection Regulation 1998 (Queensland)
EPA	Environmental Protection Agency (Queensland) (obsolete: now Department of Environment and Heritage Protection)
EPAV	Environmental Protection Agency Victoria
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EPP (Air)	<i>Environment Protection (Air) Policy 2008</i> (Queensland)
EPP (Noise)	<i>Environment Protection (Noise) Policy 2008</i> (Queensland)
EPP (Water)	<i>Environmental Protection (Water) Policy 2009</i> (Queensland)
ERA	environmentally relevant activity
ESA	environmentally sensitive area
EV	environmental values
EVNT	A species of wildlife listed as endangered, vulnerable or near threatened under the <i>Nature Conservation Act 1992</i> , and/or under the EPBC Act, as 'extinct in the wild', 'critically endangered', 'endangered' or 'vulnerable'
FCF	field compression facility
FEED	front end engineering design
FIFO	fly-in / fly-out
GAB	Great Artesian Basin
GARID	<i>Guidelines for Assessment of Road Impacts of Development</i>
GBR	Great Barrier Reef
GDE	groundwater dependent ecosystem
GHG	Greenhouse Gas
GIS	Geographical Information System
GLNG	Gladstone Liquefied Natural Gas
GPR	ground penetrating radar
Greentape Reduction Act	<i>Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2013</i>
GWDB	groundwater database
GWP	global warming potential

## Section 18 Glossary, Abbreviations and Units

Abbreviation	Definition
HDPE	high density polyethylene
HES	high ecological significance
HFB	horizontal flow barrier
HSBN	High Speed Backbone Network
IAA	Immediately Affected Area
IESC	Independent Expert Scientific Committee
IPCC	Intergovernmental Panel on Climate Change
IPF	Integrated Production Facility
IRC	Isaac Regional Council
JTA	Jan Taylor and Associates Australia Pty Ltd
KRA	Key Resource Areas
LAA	Long-term Affected Area
LNG	liquefied natural gas
LULUCF	Land Use, Land Use Change and Forestry
LWBC	Land and Water Biodiversity Committee
MBL	multi-branch laterals
MCA	multi criteria assessment
MMI	Modified Mercalli Intensity
MNES	Matters of National Environmental Significance
MSDS	material safety data sheet
N <sub>2</sub> O	nitrous oxide
Na <sub>2</sub> CO <sub>3</sub>	sodium carbonate
NaCl	sodium chloride
NaHCO <sub>3</sub>	sodium bicarbonate
NC Act	<i>Nature Conservation Act 1992 (Queensland)</i>
NEPC Act	<i>National Environment Protection Council Act 1994 (Commonwealth)</i>
NEPM	National Environment Protection Measure
NGER	National Greenhouse and Energy Reporting
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007 (Commonwealth)</i>
NMBSC	National Minimum Bore Specifications Committee
NNM	not normally manned
NO <sub>2</sub>	nitrous oxide
NO <sub>x</sub>	oxides of nitrogen
NPI	National Pollution Inventory
NRM	Department of Natural Resources and Mines
NRW	non-resident workers
NSP	Network Service Providers
NTEC	NTEC Environmental Technology
NZS	New Zealand Standard
O <sub>3</sub>	Ozone

## Section 18 Glossary, Abbreviations and Units

Abbreviation	Definition
OGIA	Office of Groundwater Impact Assessment
PAA	Priority Agricultural Areas
PALU	Priority Agricultural Land Uses
P&G Act	<i>Petroleum and Gas (Production and Safety) Act 2004</i> (Queensland)
PGA Noise Guideline	Prescribing Noise Conditions for Environmental Authorities for Petroleum and Gas Activities
PL	petroleum lease
PLA	petroleum lease application
PM	particulate matter
Project	Bowen Gas Project
Q1	first quarter (of the calendar year)
Qld	Queensland
QWC	Queensland Water Commission
QWQG	Queensland Water Quality Guidelines 2009
RAP	remediation action plan
RE	Regional Ecosystems
RIA	Road Impact Assessment
RMP	Road-use Management Plan
ROW	right of way
RUMP	Road Use Management Plan (now RMP)
RWF	regulated waste facility
SATURN	Simulation and Assignment of Traffic to Urban Road Networks
SCADA	Supervisory Control and Data Acquisition
SCR	State Controlled Road
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
SIMS	Spring Impact Management Strategy
SIS	surface-in-seam
SKM	Sinclair Knight Merz
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	oxides of sulfur
SP Act	<i>Sustainable Planning Act 2009</i> (Queensland)
SP Regulation	Sustainable Planning Regulation 2009
SPP	state planning policy
SREIS	Supplementary Report to the Environmental Impact Statement
TAPM	The Air Pollution Model
TAPM-GRS	TAPM Generic Reaction Scheme
TDS	total dissolved solids
TMR	Department of Transport and Main Roads (Queensland)
ToR	Terms of Reference

## Section 18 Glossary, Abbreviations and Units

Abbreviation	Definition
TWAF	temporary workforce accommodation facility
US EPA	United States Environmental Protection Agency
UWIR	Underground Water Impact Report
VKT	vehicle kilometres travelled
VM Act	<i>Vegetation Management Act 1999</i> (Queensland)
VOC	volatile organic compound
Water Act	<i>Water Act 2000</i> (Queensland)
WBCSD	World Business Council for Sustainable Development
WERD	Water Entitlements Registration Database
WHO	World Health Organisation
WMS	Water Monitoring Strategy
WP	Worley Parsons
WQO	water quality objective
WRI	World Resources Institute
WTF	water treatment facility
WTS	water transfer station

## Section 18 Glossary, Abbreviations and Units

### 18.3 Units

Term	Definition
+/-	The margin of error (plus or minus) associated with a measurement
%	per cent
°C	degrees Celsius
µg/L	micrograms per litre
µg/m <sup>3</sup>	micrograms per cubic metre
µS/cm	microSiemens per centimetre
CO <sub>2</sub> -e	carbon dioxide equivalents
dB	decibel ratio
dB(A)	decibels – A – weighted
g/s	grams per second
GJ	gigajoules
GL	gigalitres
GL/a	gigalitres per annum
GL/d	gigalitres per day
ha	hectare
K	kelvin
kg	kilogram
kg/a	kilograms per annum
kg/s	kilograms per second
km	kilometre
km <sup>2</sup>	square kilometre
kPa	kilopascal
kPag	kilopascal gauge
kV	kilovolt
kVA	kilovolt ampere
kW	kilowatt
L	litre
LA <sub>1, adj, 1 hour</sub>	A-weighted sound pressure level, adjusted for tonal character or impulsiveness, that is exceeded for 1% of a 1 hour period
LA <sub>10,18hr</sub>	A-weighted sound pressure level that is exceeded for 10% of every hour over 18 consecutive hours between 6 am and 12 midnight
LA <sub>10, adj, 1 hour</sub>	A-weighted sound pressure level, adjusted for tonal character or impulsiveness that is exceeded for 10% of a 1 hour period
LA <sub>90</sub>	background noise level
LA <sub>eq</sub>	A weighted equivalent noise level measure in decibels
LA <sub>eq, adj, 1 hour</sub>	A weighted equivalent noise level measured in decibels over a period of 1 hour and adjusted for tonality
m	metre
m <sup>2</sup>	square metre

## Section 18 Glossary, Abbreviations and Units

Term	Definition
m <sup>3</sup>	cubic metre
m <sup>3</sup> /s	cubic metres per second
m/day	metres per day
mg	milligram
mg/L	milligrams per litre
ML	megalitre
ML/d	megalitres per day
mm	millimetre
Mm/a	millimetres per annum
Mt	million tonnes
MW	megawatt = one million (10 <sup>6</sup> ) watts
NTU	Nephelometric Turbidity Units
pH	The absolute value of the decimal logarithm of the hydrogen-ion concentration (activity), used as an indicator of acidity (pH less than 7) or alkalinity (pH greater than 7) or neutrality (pH 7)
PJ	petajoule; equivalent to 10 <sup>15</sup> joules of energy
PM <sub>10</sub>	particulates with aerodynamic diameter less than 10 micrometres
PM <sub>2.5</sub>	particulates with aerodynamic diameter less than 2.5 micrometres
t	tonne
t/yr	tonnes per year
TJ	terajoule (10 <sup>12</sup> joules)
TJ/d	terajoules per day
VKT	vehicle kilometres of travel