

# ENVIRONMENTAL ASSESSMENT

## South East Fibre Exports 5.5 MW Biomass Power Plant



### Volume 1 – Main Report

March 2010

**URS**



## Statement of Validity

### Submission of Environmental Assessment

Prepared under Part 3A of the *Environmental Planning and Assessment Act 1979*

### Environmental Assessment prepared by

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### Applicant & Land Details

<b>Applicant</b>	South East Fibre Exports Pty Ltd PO Box 189 Eden, NSW 2551
<b>Application No.</b>	S08_01909
<b>Subject Site</b>	Eden, NSW
<b>Land to be developed</b>	Lot 3, DP 529447
<b>Project Summary</b>	Construction and operation of a 5.5 MW Biomass Power Plant and associated infrastructure.

### Environmental Assessment

An Environmental Assessment is attached.

### Declaration

I certify that I have prepared the contents of the Environmental Assessment in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* and Regulation and that, to the best of my knowledge, the information contained in this report is not false or misleading.

### Signature



<b>Name</b>	<b>Kathryn Tinker</b>
<b>Date</b>	<b>4 March 2010</b>



<b>Ian McCardle</b>
<b>4 March 2010</b>

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## Abbreviations, Units and Glossary

### ABBREVIATIONS

<b>AAUs</b>	Assigned Amount Units
<b>ABL</b>	Assessment Background Level
<b>ABWMAC</b>	Australian Ballast Water Management Advisory Council
<b>AEMO</b>	Australian Energy Market Operator
<b>AFS</b>	Australian Forestry Standard
<b>AGO</b>	Australian Greenhouse Office
<b>AHD</b>	Australian Height Datum
<b>AHIMS</b>	Aboriginal Heritage Information Management System
<b>ANL</b>	Acceptable Noise Level
<b>APZ</b>	Asset Protection Zone
<b>AWS</b>	Automatic Weather Station
<b>BCA</b>	Building Code of Australia
<b>BoM</b>	Bureau of Meteorology
<b>BVSC</b>	Bega Valley Shire Council
<b>CASA</b>	Civil Aviation and Safety Authority
<b>CPRS</b>	Carbon Pollution Reduction Scheme
<b>CEMP</b>	Construction Environmental Management Plan
<b>CH<sub>4</sub></b>	Methane
<b>CLM Act</b>	<i>Contaminated Land Management Act 1997</i>
<b>CMA</b>	Catchment Management Authorities
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CO<sub>2</sub>-e</b>	Carbon dioxide equivalent
<b>CoC</b>	Chain of Custody
<b>Cu+</b>	Cupro ions
<b>DA</b>	Development Application
<b>DECC</b>	Department of Environment and Climate Change
<b>DECCW</b>	Department of Environment, Climate Change and Water
<b>DFA</b>	Defined Forest Area
<b>DGRs</b>	Director-General's Requirements
<b>DoP</b>	Department of Planning
<b>DPI</b>	Department of Primary Industries
<b>EA</b>	Environmental Assessment
<b>EAC</b>	East Australian Current
<b>ECRTN</b>	Environmental Criteria for Road Traffic Noise
<b>EEC</b>	Endangered Ecological Community
<b>EFDC</b>	Environmental Fluid Dynamics Code
<b>ELALC</b>	Eden Local Aboriginal Land Council
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>ENCM</b>	Environmental Noise Control Manual
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i>
<b>EP&amp;A Reg</b>	<i>Environmental Planning and Assessment Regulation 2000</i>
<b>EPA</b>	Environment Protection Authority
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
<b>EPI</b>	Environmental Planning Instrument
<b>EPL</b>	Environment Protection Licence
<b>ESD</b>	Ecologically Sustainable Development

## Abbreviations, Units and Glossary

<b>ESP</b>	Electrostatic Precipitator
<b>FSC</b>	Forest Stewardship Council
<b>GHG</b>	Greenhouse Gas
<b>GPS</b>	Global Positioning System
<b>HAP</b>	Hazardous Air Pollutant
<b>HF</b>	Hydrogen Fluoride
<b>HHV</b>	Higher Heating Value
<b>HPPs</b>	Habitat Protection Plans
<b>INP</b>	Industrial Noise Policy (EPA, 2000)
<b>IPCC</b>	International Panel on Climate Change
<b>IPZ</b>	Inner Protection Zone
<b>ISO</b>	International Standards Organisation
<b>KTP</b>	Key Threatening Process
<b>LALC</b>	Local Aboriginal Land Council
<b>LEP</b>	Local Environmental Plan
<b>LGA</b>	Local Government Area
<b>LHV</b>	Lower Heating Value
<b>LoS</b>	Level of Service
<b>mAGL</b>	Meters above ground level
<b>MGA</b>	Map Grid of Australia
<b>MRET</b>	Mandatory Renewable Energy Target
<b>MSLR</b>	Mean Sea Level Rise
<b>MWQO</b>	Marine Water Quality Objectives
<b>NA</b>	Not Applicable
<b>NATA</b>	National Association of Testing Authorities
<b>NATO</b>	North Atlantic Treaty Organization
<b>NW Act</b>	<i>Noxious Weeds Act 1993</i>
<b>NEM</b>	National Electricity Market
<b>NEMMCO</b>	National Electricity Market Management Company
<b>NEPC</b>	National Environment Protection Council
<b>NEPM</b>	National Environment Protection Measure
<b>NES</b>	National Environmental Significance
<b>NGA</b>	National Greenhouse Account
<b>NGACs</b>	NSW Greenhouse Abatement Certificate
<b>NGRS</b>	National Greenhouse Response Strategy
<b>NHMRC</b>	National Health and Medical Research Council
<b>NMHCs</b>	Non-methane hydrocarbons
<b>NO<sub>2</sub></b>	Nitrogen dioxide
<b>NO<sub>x</sub></b>	Oxides of nitrogen
<b>NPI</b>	Nippon Paper Industries
<b>NPW Act</b>	<i>National Parks and Wildlife Act 1974</i>
<b>NPWS</b>	National Parks and Wildlife Service
<b>NSW</b>	New South Wales
<b>NV Act</b>	<i>Native Vegetation Act 2003</i>

## Abbreviations, Units and Glossary

<b>O<sub>3</sub></b>	Ozone
<b>OEMP</b>	Operation Environmental Management Plan
<b>OH&amp;S</b>	Occupational Health and Safety
<b>OPA</b>	Outer Protection Area
<b>ORER</b>	Office of the Renewable Energy Regulator
<b>OU</b>	Odour Unit
<b>Pa</b>	Pascal (unit of sound pressure)
<b>PAH</b>	Polycyclic Aromatic Hydrocarbons
<b>PM<sub>10</sub></b>	Particles effectively less than 10 µm in diameter
<b>PM<sub>2.5</sub></b>	Particles effectively less than 2.5 µm in diameter
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997</i>
<b>PSNL</b>	Project-Specific Noise Levels
<b>RBL</b>	Rating Background Level
<b>REC</b>	Renewable Energy Certificates
<b>RET</b>	Renewable Energy Target
<b>RFS</b>	Rural Fire Service
<b>RO</b>	Reverse Osmosis
<b>RTA</b>	Roads and Traffic Authority
<b>SCUBA</b>	Self Contained Underwater Breathing Apparatus
<b>SEFE</b>	South East Fibre Exports Pty Ltd
<b>SEPP</b>	State Environmental Planning Policy
<b>SERCA</b>	South East Regional Conservation Alliance
<b>SO<sub>2</sub></b>	Sulphur dioxide
<b>SO<sub>x</sub></b>	Sulphur oxides
<b>SOO</b>	Statement of Opportunities
<b>SPL</b>	Sound Power Levels
<b>TAPM</b>	The Air Pollution Model
<b>TEC</b>	Threatened Ecological Communities
<b>TEQ</b>	Toxic Equivalents
<b>TOC</b>	Total Organic Carbon
<b>TPH</b>	Total Petroleum Hydrocarbons
<b>TSC Act</b>	<i>Threatened Species Conservation Act 1995</i>
<b>TSP</b>	Total suspended particulate
<b>UILT</b>	Upper incipient lethal temperature
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>USEPA</b>	US Environmental Protection Agency
<b>VOC</b>	Volatile Organic Compound
<b>WA&amp;RR Act</b>	<i>Waste Avoidance and Resource Recovery Act 2001</i>
<b>WHO</b>	World Health Organization
<b>WM Act</b>	<i>Water Management Act 2000</i>

## Abbreviations, Units and Glossary

### UNITS

°C	Degrees celsius
μ	Micron
cm	Centimetres
dB	Decibel
g	Gram
GL	Gigalitre (10 <sup>9</sup> L or 10 <sup>6</sup> m <sup>3</sup> )
GWh	Gigawatt hour
Ha	Hectare
hr	Hour
Hz	Hertz
kg	Kilogram
kJ	Kilojoule
kL	Kilolitre (10 <sup>3</sup> L or 1 m <sup>3</sup> )
km	Kilometre
km/h	Kilometres per hour
kPa	Kilopascal
kV	Kilovolt
kW	Kilowatt
L/s	Litres per second
m	Metre
m <sup>2</sup>	Square metres
m <sup>3</sup>	Cubic metres
mg	Milligrams
MHz	Megahertz
ML	Megalitre (10 <sup>6</sup> L or 10 <sup>3</sup> m <sup>3</sup> )
MW	Megawatt
Nm <sup>3</sup>	Normal cubic meter
pa	Per annum
ppm	Parts per million
s	Second
t	Tonne
tph	Tonnes per hour
Yr	Year

## Abbreviations, Units and Glossary

### GLOSSARY

<b>Aboriginal archaeological site (Aboriginal site)</b>	A place where physical remains or modification of the natural environment indicate past and 'traditional' activities by Aboriginal people. Site types include artefact scatters, isolated artefacts, burials, shell middens, scarred trees, quarries and contact sites.
<b>acid sulphate soils (ASS)</b>	Soils containing pyrite which produces sulphuric acid when exposed to oxygen.
<b>ambient</b>	Surrounding environment.
<b>aquaculture</b>	Aquaculture is the farming of freshwater and saltwater organisms such as finfish, molluscs, crustaceans and aquatic plants.
<b>aquifer</b>	Rock formation containing water in recoverable quantities.
<b>Asset Protection Zone (APZ)</b>	A fuel reduced area surrounding a built asset or structure.
<b>background scatter</b>	Aboriginal artefacts that cannot be usefully related to a place or focus of past activity.
<b>bathymetry</b>	The study of underwater depth of lake or ocean floors.
<b>bioaccumulation</b>	The accumulation of substances such as pesticides or other organic chemicals in an organism. Bioaccumulation occurs when an organism absorbs a toxic substance at a rate greater than that at which the substance is lost. Thus, the longer the biological half-life of the substance the greater the risk of chronic poisoning, even if environmental levels of the toxin are not very high.
<b>biodiversity</b>	First coined in 1988 as a contraction of biological diversity; diversity traditionally referring to species richness and species abundance. Biodiversity has been defined subsequently as encompassing biological variety at genetic, species and ecosystem scales (DASETT 1992). The maintenance of biodiversity, at all levels, is acknowledged internationally as a high conservation priority, and is protected by the International Convention on Biological Diversity 1992.
<b>biofouling</b>	The undesirable accumulation of microorganisms, plants, algae, and / or animals on wetted structures.
<b>biomass</b>	Biological material derived from living, or recently living organisms, such as wood, waste, and alcohol fuels. Biomass is commonly plant matter grown to generate electricity or produce heat. For example, forest residues (such as dead trees, branches and tree stumps), yard clippings and wood chips may be used as biomass.
<b>building curtilage</b>	The area immediately around the perimeter of a structure.
<b>bunds</b>	An earthwork or wall to contain and control spillages, normally associated with tank farms, fuelling and chemical storage facilities.
<b>cetaceans</b>	The order Cetacea includes whales, dolphins and porpoises.
<b>Critical habitat</b>	An area of land that is crucial to the survival of a particular threatened species, population or ecological community.
<b>CO<sub>2</sub>-e</b>	The carbon dioxide equivalent relates to the greenhouse warming potential (GWP) of a certain gas compared to that of carbon dioxide where carbon dioxide has a GWP of 1. For example, methane (CH <sub>4</sub> ) has a GWP of 21, meaning that a release of 100 tonnes of CH <sub>4</sub> would be the equivalent to releasing 2100 tonnes of CO <sub>2</sub> in terms of global warming.

## Abbreviations, Units and Glossary

### Construction Environmental Management Plan

An element of an Environmental Management Plan that addresses the control, training and monitoring measures to be implemented during the construction phase of a project in order to avoid, minimise or ameliorate potentially adverse impacts identified during environmental assessments.

### cumulative effect dB(A)

Refers to the accumulation of effects over time.

The A-weighting has a frequency response corresponding approximately to that of human hearing. People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the "loudness" of that sound. Different sources having the same dBA level generally sound about equally as loud, although the perceived loudness can also be affected by the character of the sound (e.g. the loudness of human speech and a distant motorbike may be perceived differently, although they are of the same dBA level).

### Deaerator

A device that is widely used for the removal of air and other dissolved gases from the feedwater to steam-generating boilers.

### Ebb

The rise and fall of sea levels caused by the combined effects of the rotation of the Earth and the gravitational forces exerted by the Moon and the Sun.

### Ecologically Sustainable Development

Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future can be increased.

### ecosystem

An interdependent system of interacting plants, animals and other organisms together with the non-living (physical and chemical) components of their surroundings.

### effluent

The outflow of liquid e.g. from sewage or an industrial process.

### emergency response

The reaction by emergency services such as Fire, Police, Ambulance, Industrial Fire Brigades, etc., to an emergency.

### embedded energy

Defined as the available energy that was used in the work of making a product. It is an accounting methodology which aims to find the sum total of the energy necessary for an entire product lifecycle. This lifecycle includes raw material extraction, transport, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition.

### emission factors

A factor expressed as the amount of greenhouse gas emitted per unit of activity, which is then used to determine inventories for a site

### endangered ecological community

A community listed under Schedule 1, Part 3 of the NSW *Threatened Species Conservation Act 1995*.

### endangered species

Those plants and animal species likely to become extinct unless action is taken to remove or control the factors that threaten their survival.

### entrainment

Entrainment results when organisms small enough to fit through the intake screen are taken through the intake system and exposed to mechanical stress, heated water and chemicals.

### Environmental Management Plan

The control, training and monitoring measures to be implemented during the design, construction and operation phases of a project in order to avoid, minimise or ameliorate potentially adverse impacts identified during environmental (being socio-economic, cultural, physical, biological) assessments.

## Abbreviations, Units and Glossary

<b>Environmental Management System</b>	The concept and major components of an Environmental Management System (EMS) are set out in the Australian/New Zealand Standard (AS/NZS) ISO 14001. An EMS has several key components as set out below: organisational commitment, corporate environmental policy, environmental aspects register, objectives and performance indicators, environmental management program documentation (often called an Environmental Management Plan or EMP), operational and emergency procedures, responsibility and reporting structure, training and awareness program, environmental impact, regulatory and legal compliance, and environmental performance review audits performance monitoring and measurement.
<b>fauna</b>	Animals.
<b>fire fence</b>	A gap in vegetation or fuels which prevents or hinders the spread of fire.
<b>flora</b>	Plants.
<b>floristic composition</b>	The plant species present in a particular community, sub-community or site.
<b>free ammonia</b>	The toxic fraction of ammonia (NH <sub>3</sub> ) that is undissociated and therefore available for uptake by organisms. The usual source of ammonia to waterways is domestic sewage and industrial effluents.
<b>GGAS</b>	The Greenhouse Gas Reduction Scheme (GGAS) commenced on 1 January 2003. It is one of the first mandatory GHG emissions trading schemes in the world and is specifically associated with the electricity generation sector. GGAS aims to reduce GHG emissions in NSW by 5% per capita below 1989/90 levels by 2007, by encouraging project based activities to offset the production of GHG emissions.
<b>geotechnical</b>	Relating to the form, arrangement and structure of the geology.
<b>geothermal power</b>	Power extracted from heat stored in the earth. This geothermal energy originates from the original formation of the planet, from radioactive decay of minerals, and from solar energy absorbed at the surface.
<b>Greenhouse Gas</b>	A gas which has an effect on the radioactive absorptivity of the earth's atmosphere and the atmosphere's temperature.
<b>Greenhouse Effect</b>	Predicted global climatic change (e.g. global warming) associated with build up of certain gases (such as water vapour, carbon dioxide, methane, chlorofluorocarbons, ozone, nitrous oxide, etc.) within the atmospheric environment of the earth. These are known as Greenhouse Gases.
<b>Greenhouse gas intensity</b>	The amount of greenhouse gases per unit of energy produced from a power source (e.g. in units of kg CO <sub>2</sub> -e/MWh).
<b>Greenhouse Gas Protocol</b>	A globally accepted procedure for companies to quantify, report and reduce their greenhouse gas emissions.
<b>groundwater</b>	Subsurface water contained within the saturated zone.
<b>habitat features</b>	Include features which provide foraging or nesting habitat such as fallen timber, hollow logs, standing hollow bearing trees, stags, or stands of flora fed species.
<b>habitat fragmentation</b>	The break-up of habitats into discontinuous chunks, such as when vegetation is cleared for human settlements, roads or agriculture. It prevents animal migration and limits food supplies.
<b>heritage (cultural heritage)</b>	A term which encompasses Aboriginal and post-contact archaeological sites and material remains (cultural resources).

## Abbreviations, Units and Glossary

<b>higher heating value</b>	The heat content of fuel, measured in a bomb calorimeter when the products of combustion are cooled to the initial temperature and all of the water vapour formed during combustion is condensed to liquid. This gives the gross, or higher heat content of the fuel, which includes in the reported value the heat of vaporisation of the water produced from combustion of hydrogen atoms in the fuel. The lower heating value excludes the heat of vaporisation of the water produced from combustion of hydrogen atoms in the fuel.
<b>hydrocarbons</b>	A class or compounds containing only carbon and hydrogen in various structures. Both naturally occurring and from anthropogenic sources.
<b>hydrology</b>	Surface water and groundwater and their interaction with earth materials.
<b>hydrogeology</b>	The study of subsurface water in its geological context.
<b>impingement</b>	The entrapment of organisms on the intake screen.
<b>INTANAL</b>	Specialist traffic model for intersection analysis.
<b>intertidal</b>	The intertidal zone (also known as the foreshore and seashore and sometimes referred to as the littoral zone) is the area that is exposed to the air at low tide and underwater at high tide (for example, the area between tide marks).
<b>invertebrate</b>	An animal without a backbone.
<b>isolated find</b>	Single stone artefact, not located within a rock shelter which occurs without any associated evidence of Aboriginal occupation within a radius of 60 m.
<b>key threatening process</b>	Defined under the TSC Act as 'a process that threatens, or may have the capability to threaten the survival or evolutionary development of species, populations or ecological communities'.
<b>LA<sub>1</sub></b>	The noise level exceeded for 1% of the 15 minute interval.
<b>LA<sub>10</sub></b>	The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
<b>LA<sub>90</sub></b>	The LA <sub>90</sub> level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the LA <sub>90</sub> level for 10% of the time. This measure is commonly referred to as the background noise level.
<b>LA<sub>eq</sub></b>	The equivalent continuous sound level (LA <sub>eq</sub> ) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.
<b>LA<sub>eq</sub> (1hr)</b>	The LA <sub>eq</sub> noise level for a one hour period.
<b>LA<sub>eq</sub> (15 hr)</b>	The LA <sub>eq</sub> noise level for the period 7am to 10pm.
<b>LA<sub>eq</sub> (9 hr)</b>	The LA <sub>eq</sub> noise level for the period 10pm to 7am.
<b>L<sub>eq</sub></b>	The equivalent continuous sound level in dB(A); that is, the constant sound level which has the same acoustic energy as the original fluctuating noise for the same period of time.
<b>Leachate collection system</b>	potentially contaminated surface runoff from the site is collected via leachate drains and directed to collection pits for pumping to the water treatment plant.
<b>Level of Service</b>	A description of the operating performance of a road or intersection as defined in Austroads 'Guide to Traffic Engineering Practice, Pt 2 – Road Capacity.'
<b>lignocellulose</b>	The combination of lignin and cellulose in the structural cells of woody plants
<b>lithologies</b>	Rock types.



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<b>Lower Heating Value (LHV)</b>	The heat content of fuel, measured in a bomb calorimeter when the products of combustion are cooled to the initial temperature and all of the water vapour formed during combustion is condensed to liquid. The lower heating value excludes the heat of vaporisation of the water produced from combustion of hydrogen atoms in the fuel.
<b>Macroalgal beds</b>	Seaweed beds
<b>Mandatory Renewable Energy Target (MRET) scheme</b>	A market-based measure that encourages renewable energy deployment by creating an obligation for electricity retailers and large users to purchase Renewable Energy Certificates that are created by renewable energy generators.
<b>middens</b>	Midden deposits can contain a variety of archaeological material, including animal bone, feces, shell, botanical material, vermin, sherds, lithics (especially debitage), and other artifacts and ecofacts associated with past human occupation.
<b>mixing zone</b>	A mixing zone is an explicitly defined area around a discharge where certain environmental values would not be protected.
<b>mysticetes</b>	Baleen whales
<b>National Greenhouse Gas Inventory</b>	The latest available national account of Australia's greenhouse gas emissions
<b>native vegetation</b>	A broad term for vegetation comprised of plant species which occur naturally in Australia (but which are not necessarily indigenous).
<b>natural gas</b>	Combustible gas formed naturally in the earth.
<b>neap tide cycle</b>	Certain points in the lunar cycle when the tide's range is at its minimum: this is called the <i>neap tide</i> . Neaps result in less extreme tidal conditions.
<b>normal cubic meter (Nm<sup>3</sup>)</b>	Unit of mass for gases equal to the mass of 1 cubic meter at a pressure of 1 atmosphere and at a standard temperature, often 0°C (32 °F) or 20°C (68 °F).
<b>oceanography</b>	The branch of Earth science that studies the ocean. It covers a wide range of topics, including marine organisms and ecosystem dynamics; ocean currents, waves, and geophysical fluid dynamics; plate tectonics and the geology of the sea floor; and fluxes of various chemical substances and physical properties within the ocean and across its boundaries.
<b>odontocetes</b>	Toothed whales
<b>Office of the Renewable Energy Regulator</b>	The statutory authority established to administer the Government's <i>Renewable Energy (Electricity) Act 2000</i> and the <i>Renewable Energy (Electricity) Regulations 2001</i> .
<b>Operation Environmental Management Plan</b>	An element of an Environmental Management Plan that addresses the control, training and monitoring measures to be implemented during the construction phase of a project in order to avoid, minimise or ameliorate potentially adverse impacts identified during environmental assessments.
<b>organochlorines</b>	A group of organic chemicals used in pesticides. Most organochlorine pesticides have low water-solubility, but high chemical and biological stability. They are fat soluble and tend to accumulate in the fat tissue of organisms.
<b>particulate</b>	Small particles, usually in suspension.
<b>Petroleum hydrocarbons [total petroleum hydrocarbons (TPH)]</b>	A class of organic compounds arising from unburnt fuel sources.
<b>photochemical smog</b>	Air pollution caused by photochemical reactions involving hydrocarbons, nitrogen oxides and other pollutants, especially in still air over cities.

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<b>pigging</b>	Pigging in the maintenance of pipelines refers to the practice of using pipeline inspection gauges or 'pigs' to perform various operations on a pipeline without stopping the flow of the product in the pipeline. These operations include but are not limited to cleaning and inspection of the pipeline.
<b>piles</b>	Type of foundation using columns of concrete, steel or timber.
<b>pinnipeds</b>	Refers to seals, sea-lions and walrus's. The word pinniped means 'fin foot'. Pinnipeds have developed feet into flippers to better suit their life in the sea.
<b>plume</b>	Area of impact extending from a source.
<b>Polycyclic aromatic hydrocarbons (PAH)</b>	A class of organic chemicals, PAHs are formed by incomplete combustion or organic material, diagenesis (during or throughout generation) and biosynthesis. PAHs are naturally occurring, however, a significant proportion are the result of anthropogenic combustion.
<b>Register of the National Estate</b>	A list of the National Estate developed under the provisions of the Commonwealth's <i>Australian Heritage Commission Act 1975</i> .
<b>risk</b>	Likelihood of a specific undesirable event occurring within a specified period or in specified circumstances. Listed as a frequency or probability.
<b>risk assessment</b>	A process used to determine whether people and the environment are at risk (e.g. health and safety) from exposure to hazardous substances used or produced (mainly in an industrial or work place) so that appropriate control measures or management practices can be introduced to prevent or minimise the risk.
<b>scarred trees</b>	Trees which have had bark removed by indigenous Australians for the creation of canoes, shelters, shields and containers, such as coolamons. They are among the easiest to find archaeological sites in Australia.
<b>Sediment / detention pond</b>	Artificial earthen depression to retain water runoff for a period of time so as to control high intensity runoff.
<b>Sessile marine animals</b>	Animals which are not able to move about; e.g. tunicates, barnacles and mussels.
<b>storm surge</b>	A storm surge is the local change in the sea surface elevation due to the combined effect of falling atmospheric pressure associated with the passing of a weather system and intense winds which push the water against the coast. The combined effect of the weather system and persistent winds over a shallow water body is the most common cause of a storm surge and resultant flooding problems.
<b>subtidal</b>	Permanently inundated zone; does not extend far from the shore.
<b>sustainable use</b>	Use of organism, ecosystem or their renewable resource at a rate within its capacity for renewal.
<b>TAPM</b>	The Air Pollution Model is an air quality dispersion model developed by the Commonwealth Scientific Investigation & Research Organisation.
<b>TBT</b>	Tributyltin. TBT based paints were used for antifouling efforts.
<b>terrestrial</b>	Of or pertaining to the land as distinct from the water.
<b>thermal efficiency</b>	The proportion of energy converted from the fuel to electricity in the generation process is an indication of CO <sub>2</sub> emissions.
<b>total aromatic hydrocarbons</b>	A class of organic chemicals which contain an aromatic ring (e.g. benzene, anthracene, naphthalene and their derivatives). Used in chemical and pharmaceutical industries.
<b>total organic carbon (TOC)</b>	The amount of carbon in the organic form contained in a sample, measured as a percentage.

## Abbreviations, Units and Glossary

<b>total suspended solids (TSS)</b>	Total load of particulates in water, measured in mg/L.
<b>transect</b>	A transect is a path along which one records and counts occurrences of the phenomena of study (e.g. plants noting each instance).
<b>transmission losses</b>	Energy losses incurred when power is transmitted over long distances.
<b>trawl</b>	A fishing net. A trawl survey is the method of towing a trawl along the sea floor.
<b>turbidity</b>	Liquid's ability to intercept light. Measured in nephelometric turbidity units (NTU). Cannot be consistently correlated with the concentration of suspended matter.
<b>visibility</b>	Measure of extent to which particular components of a development may be visible from surrounding areas.
<b>visual absorption capacity</b>	An estimation of the capacity of the landscape to absorb development without creating a significant change in visual character or producing a reduction in scenic quality.
<b>volatiles</b>	Any chemical compound which will evaporate quickly due to its low boiling point.
<b>vulnerable species</b>	Those that may soon become endangered unless action is taken.
<b>waders</b>	Synonymous with shorebirds.
<b>wind climate</b>	A description of the meteorological conditions created by the wind involving measurements of wind speed, direction and frequency of gusts for average, seasonal and annual conditions.