

VOLUME 1 MAIN REPORT JULY 2011

AGL Dalton Power Project Environmental Assessment

MP10-0035



URS



Switched on Business.

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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Address URS Australia Pty Ltd
Level 4
407 Pacific Highway
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Application No. MP10-0035

In respect of

Applicant & Land Details

Applicant AGL Energy Limited
Level 22, 101 Miller St
NORTH SYDNEY NSW 2060

Subject Site Approximately 508 hectare site located off Walshs Road, approximately 4km north of the town of Dalton, in the Upper Lachlan Shire Council local government area

Lot & DP Lot 115,249,252,253,305,307 in DP754111,
Lot 14, 183,184,187,200,283,306 in DP 754111;
Lots 1 & 2, DP 126122,
Lot 116, 321, 322, 162, 317, 318 in DP754111
Lots 21,186 and 251 in DP754111;
Lot 1 DP 126119, Walshs Road easement
Lots 30 and 31 in DP754111

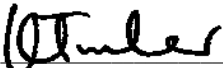
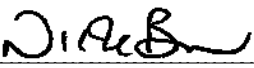
Project Summary Construction of a gas fired power station, in stages, with the initial stage comprising between two and four open cycle gas turbines with a capacity of between 250 and 750 megawatts and the ultimate stage comprising a facility with a capacity of up to 1,500 megawatts.
Construction of gas pipeline, access road and transmission line connection.

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		
Name	Kathryn Tinker	Nicole Brewer

Date July 2011

Contents

Volume 1 – Main Report

Statement of Validity	
Table of Contents	i
List of Tables, Figures and Appendices	v
Notes on Text	ix
Making a Submission	xi
Abbreviations	xiii
Glossary.....	xvii
Executive Summary	ES-1
1 Introduction	1-1
Introduction - Summary of Key Outcomes	1-1
1.1 Background.....	1-2
1.2 Project Outline	1-2
1.3 Project Objectives	1-5
1.4 The Proponent	1-5
1.5 Environmental Assessment Process	1-6
1.6 Environmental Assessment Preparation and Exhibition	1-8
1.7 Environmental Assessment Document Structure	1-10
2 Project Need and Justification.....	2-1
Project Need and Justification – Summary of Key Outcomes	2-1
2.1 Introduction	2-2
2.2 Background.....	2-2
2.3 Electricity Demand	2-4
2.4 Peak Energy Demand.....	2-7
2.5 Operation of the power station.....	2-9
2.6 AGL’s Environmental Record.....	2-9
2.7 Relationship to other projects in the region regarding EPBC matters.....	2-10
2.8 Project Benefits.....	2-11
3 Alternatives to the Proposal	3-1
Project Alternatives – Summary of Key Outcomes	3-1
3.1 Introduction	3-2
3.2 Power Generation Technology Options	3-4
3.3 Gas Turbine Technology Options	3-5
3.4 Site Selection Considerations	3-7
3.5 Plant Footprint Considerations.....	3-46
3.6 Access Road and Gas Pipeline Easement	3-48
3.7 Communications Tower and Infrastructure	3-58
3.8 Plant Technology Options.....	3-61
3.9 Do Nothing Scenario.....	3-73
3.10 Project Alternatives Conclusion	3-74
4 Project Description	4-1
Project Description – Summary of Key Outcomes.....	4-1
4.1 Overview	4-4
4.2 Development Area	4-4
4.3 Facility	4-7
4.4 Water and Wastewater	4-16

Contents

4.5	Facility Management	4-25
4.6	Infrastructure	4-27
4.7	Other site areas within the AGL property	4-30
4.8	Operating Hours and Staffing	4-31
4.9	Project Construction	4-31
5	Statutory Planning	5-1
	Statutory Planning – Summary of Key Outcomes	5-1
5.1	Introduction.....	5-2
5.2	State Legislation.....	5-2
5.3	Protection of the Environment Operations Act 1997	5-4
5.4	Environmental Planning Instruments.....	5-8
5.5	Commonwealth Legislation	5-12
6	Consultation.....	6-1
	Consultation - Summary of Key Outcomes	6-1
6.1	Introduction.....	6-2
6.2	Consultation Activities to Date.....	6-3
6.3	Aboriginal Consultation	6-10
6.4	AGL’s Consideration of Consultation Inputs.....	6-10
6.5	Commitment to Ongoing Consultation	6-11
7	Environmental Risk.....	7-1
7.1	Introduction.....	7-1
7.2	Methodology.....	7-1
7.3	Summary of Potential Environmental Risks	7-2
7.4	Conclusion.....	7-4
8	Soils, Geology and Groundwater.....	8-1
	Soils, Geology and Groundwater – Summary of Key Outcomes	8-1
8.1	Existing Environment.....	8-2
8.2	Assessment of Potential Impacts	8-5
8.3	Mitigation Measures	8-6
9	Air Quality	9-1
	Air Quality and Greenhouse Gas Emissions – Summary of Key Outcomes.....	9-1
9.1	Introduction.....	9-3
9.2	Existing Environment.....	9-3
9.3	Impacts During Construction	9-5
9.4	Impacts During Operation	9-6
9.5	Conclusion.....	9-20
9.6	Summary of Mitigation Measures.....	9-22
10	Landscape and Visual.....	10-1
	Landscape and Visual - Summary of Key Outcomes.....	10-1
10.1	Introduction.....	10-3
10.2	Methodology.....	10-3
10.3	Elements of Dalton Power Project.....	10-5
10.4	Existing Environment.....	10-6
10.5	Assessment of Visual Impact	10-14
10.6	Mitigation Measures	10-37

Contents

11	Traffic and Transport	11-1
	Traffic and Transport – Summary of Key Outcomes	11-1
11.1	Introduction	11-2
11.2	Existing Context	11-2
11.3	Traffic Generation	11-7
11.4	Assessment of Potential Impacts	11-10
11.5	Mitigation Measures	11-15
12	Noise and Vibration	12-1
	Noise Assessment – Summary of Key Outcomes	12-1
12.1	Introduction	12-3
12.2	Methodology	12-3
12.3	Existing Environment	12-7
12.4	Assessment of Impacts	12-17
12.5	Off-Site Traffic Noise	12-28
12.6	Mitigation Measures	12-29
13	Flora and Fauna	13-1
	Flora and Fauna Assessment – Summary of Key Outcomes	13-1
13.1	Introduction	13-3
13.2	Methodology	13-3
13.3	Results of Assessment	13-8
13.4	Assessment of Potential Impacts	13-14
13.5	Indirect and Operational Impacts	13-18
13.6	Biodiversity Maintenance and Improvement	13-18
13.7	Summary of Mitigation Measures	13-26
14	Water Management	14-1
	Water Management– Summary of Key Outcomes	14-1
14.1	Introduction	14-3
14.2	Existing Environment	14-3
14.3	Water Demand	14-7
14.4	Potential Water Sources and Water Treatment	14-15
14.5	Wastewater Generation and Management	14-25
14.6	Stormwater Management	14-28
14.7	Flooding	14-31
14.8	Summary of Mitigation Measures	14-33
15	Heritage	15-1
	Heritage – Summary of Key Outcomes	15-1
15.1	Introduction	15-3
15.2	Methodology	15-3
15.3	Consultation	15-4
15.4	Environmental Context.....	15-4
15.5	Aboriginal Context.....	15-5
15.6	Historic Overview	15-5
15.7	Assessment of Potential Impacts	15-6
15.8	Mitigation Measures	15-9
15.9	Mitigation Measures	15-11

Contents

16	Land Use and Property Impacts	16-1
	Land Use and Planning – Summary of Key Outcomes	16-1
16.1	Introduction.....	16-2
16.2	Existing Land Use – Development Site	16-2
16.3	Existing Land Use – Surrounding Areas	16-2
16.4	Land Use Issues Arising From Consultation	16-2
16.5	Potential Existing Land Use Conflicts.....	16-2
16.6	Potential Future Development.....	16-6
16.7	Potential Future Land Use Conflicts	16-7
16.8	Cumulative Impacts.....	16-8
16.9	Mitigation Measures	16-11
17	Socio Economic Assessment	17-1
	Socio Economic Assessment – Summary of Key Outcomes	17-1
17.1	Introduction.....	17-2
17.2	Existing Regional Socio-economic Conditions	17-2
17.3	Social Impacts	17-8
17.4	Economic Impact Analysis	17-9
17.5	Estimated Economic Impact of the Project.....	17-10
17.6	Summary of Economic Impacts.....	17-11
17.7	Mitigation Measures	17-11
18	Preliminary Hazard Analysis.....	18-1
	Preliminary Hazard Analysis – Summary of Key Outcomes	18-1
18.1	Introduction.....	18-2
18.2	Methodology	18-2
18.3	Risk Criteria.....	18-4
18.4	Potential for Hazard Incidents and Mitigation Measures	18-5
18.5	Mitigating Measures	18-11
19	Draft Statement of Commitments	19-1
	Draft Statement of Commitments - Summary of Key Outcomes.....	19-1
19.1	Introduction.....	19-2
19.2	Environmental Management	19-2
19.3	Environmental Safeguards	19-4
20	Conclusions.....	20-1
20.1	Ecologically Sustainable Development	20-1
20.2	Consistency with Objects of EP&A Act	20-3
20.3	Environmental Assessment Findings	20-5
20.4	Conclusion.....	20-8

Study Team

Tables, Figures, & Appendices

Tables

Table 1-1	NSW Department of Planning (now Department of Planning and Infrastructure) Director General's Requirements	F-11
Table 1-2	Evaluation of Commonwealth Supplementary Director General's Requirements	1-16
Table 2-1	Relationship to other projects	2-11
Table 3-1	Consumption of Gas	3-8
Table 3-2	Turbine Performance for Dalton locality	3-11
Table 3-3	Turbine Performance for Marulan locality	3-14
Table 3-4	Turbine Performance for Wagga Wagga locality	3-19
Table 3-5	Turbine Performance for Culcairn Locality	3-21
Table 3-6	Turbine Performance for North Albury Locality	3-24
Table 3-7	Turbine Performance for Central Coast Locality	3-27
Table 3-8	Turbine Performance for Lithgow Locality	3-30
Table 3-9	Turbine Performance for Moss Vale Locality	3-32
Table 3-10	Turbine Performance for Canberra locality	3-35
Table 3-11	Turbine Performance for Nowra (Tomerong) Locality	3-38
Table 3-12	Turbine Performance Wollongong locality	3-40
Table 3-13	Assessment Classification	3-43
Table 3-14	Site Assessment Summary	3-44
Table 3-15	Alternate Site Preliminary Environmental Assessment	3-44
Table 3-16	Summary of Features of Preferred Sites	3-45
Table 3-17	Site Assessment for Facility location within the Site	3-47
Table 3-18	Access Road Option 1 – Vegetation Areas	3-51
Table 3-19	Gas Pipeline (northern portion) and Access Road Option 1 – Vegetation Areas	3-53
Table 3-20	Gas Pipeline (northern portion) and Access Road Option 2 - Vegetation Areas	3-54
Table 3-21	Gas Pipeline (southern portion) Option 1 - Vegetation Areas	3-55
Table 3-22	Gas Pipeline (southern portion) Option 2 - Vegetation Areas	3-55
Table 3-23	Gas Pipeline (southern portion) Option 3 - Vegetation Areas	3-56
Table 3-24	Summary of infrastructure options	3-57
Table 3-25	Summary of Water Supply Options	3-71
Table 3-26	Summary of Potential Pretreatment Requirements for Water Supply Options	3-73
Table 4-1	Titles for Development Area	4-5
Table 4-2	Indicative Tower Configuration	4-15
Table 4-3	Indicative water demand requirements	4-17
Table 4-4	Summary of Water Supply Options	4-19
Table 4-5	Evaporation Pond Indicative Sizing	4-22
Table 4-6	Chemical List	4-25
Table 4-7	Indicative Gas Turbine equipment transport for Stage 1 and Stage 2	4-34
Table 4-8	Indicative Construction Equipment and Purpose	4-34
Table 5-1	Assessment of Project against Upper Lachlan Shire LEP 2010 aims	5-11
Table 6-1	Summary of agency and local government consultation	6-4
Table 6-2	Summary of community concerns raised during consultation	6-8
Table 7-1	Summary of Environmental Risk	7-3
Table 8-1	Summary of Mitigation Measures	8-7
Table 9-1	Summary of Background Pollutant Concentrations	9-5
Table 9-2	Gas turbine emission parameters	9-7
Table 9-3	Summary of maximum dispersion modelling results with comparison against regulatory criteria (II results in $\mu\text{g}/\text{m}^3$)	9-9
Table 9-4	Proposed in-stack emission limit for oxides of nitrogen	9-9
Table 9-5	Estimated Gas Consumption and Electricity Sent Out and Consumed	9-11

Tables, Figures, & Appendices

Table 9-6	Estimated Greenhouse Gas Emissions on an Annual Basis	9-11
Table 9-7	Estimated Greenhouse Gas Emissions on a Project Lifetime Basis	9-12
Table 9-8	Emissions intensity of various generator technology types	9-13
Table 9-9	Comparison of Proposal to State and National Greenhouse Gas Inventories	9-14
Table 9-10	Greenhouse Gas Mitigation Measures Available to the Project	9-14
Table 9-11	Maximum, minimum and average critical plume extents	9-17
Table 9-12	Heights below which the vertical velocity exceeds 4.3m/s by percentage of 2006	9-17
Table 9-13	Stage 1 - Maximum, Minimum and Average Critical Plume Extents	9-19
Table 9-14	Stage 2 - Maximum, Minimum and Average Critical Plume Extents	9-19
Table 9-15	Summary of Mitigation Measures	9-22
Table 10-1	View Location Assessment Criteria	10-4
Table 10-2	Visibility Criteria Matrix	10-5
Table 10-3	Visibility Matrix - View Locations	10-22
Table 10-4	Summary of Visual Mitigation Measures	10-37
Table 11-1	Levels of Service Rural Two-Way, Two-Lane Roads	11-3
Table 11-2	Construction Traffic Generation Predicted Average	11-8
Table 11-3	Estimated Weekday Traffic Flow Impacts - Walshs Road (sth)	11-10
Table 11-4	Estimated Weekday Traffic Flow Impacts - Dalton Road	11-11
Table 11-5	Estimated Weekday Traffic Flow Impacts - Warrataw Street	11-12
Table 11-6	Estimated Weekday Traffic Flow Impacts - Hume Street	11-12
Table 11-7	Analysis of Key Intersections - Peak Construction Traffic (AM Peak Hour)	11-13
Table 11-8	Turbine Components and Equipment Delivery Traffic Estimates	11-14
Table 11-9	Summary of Traffic Mitigation Measures	11-15
Table 12-1	Sound Pressure Levels of Some Common Sources	12-4
Table 12-2	Operational Scenarios	12-6
Table 12-3	Noise Sensitive Receptors	12-7
Table 12-4	Environmental Criteria for Road Traffic Noise	12-9
Table 12-5	Traffic Noise Criteria for Receptors	12-9
Table 12-6	Background monitoring locations representing each receiver	12-10
Table 12-7	Summary of Measured Noise Levels – All Monitoring Locations	12-10
Table 12-8	Rating Background Noise Levels – All Monitoring Locations	12-11
Table 12-9	Summary of Noise Sensitive Receptors – ECRTN Assessment	12-11
Table 12-10	Representative Traffic Noise Levels	12-13
Table 12-11	Recommended L_{Aeq} Noise Levels from Industrial Noise Sources	12-13
Table 12-12	Project-Specific Noise Levels (PSNL)	12-14
Table 12-13	Sleep Disturbance Criteria	12-15
Table 12-14	Project-specific Construction Noise Management Levels	12-16
Table 12-15	Predicted Operational Noise Levels – Scenario A	12-17
Table 12-16	Predicted Operational Noise Levels – Scenario B	12-17
Table 12-17	Predicted Operational Noise Levels – Scenario C	12-18
Table 12-18	Predicted Operational Noise Levels – Scenario D	12-18
Table 12-19	Predicted Operational Noise Levels – ISO Conditions	12-19
Table 12-20	Predicted Operational Noise Levels (A- and C-weighted) – Worst-case Scenario	12-23
Table 12-21	Predicted Operational Noise Levels (adjusted A-weighted) –Worst-case Scenario	12-23
Table 12-22	Predicted Construction Noise Levels	12-27
Table 12-23	Predicted Noise Levels during Pipeline Construction	12-28
Table 12-24	Summary of Mitigation Measures	12-30
Table 13-1	Vegetation communities recorded within AGL owned lands	13-10
Table 13-2	Vegetation Communities Affected by the proposed works	13-17
Table 13-3	Characteristics of tree hollow types used by key threatened species	13-23
Table 13-4	Project Impacts, Mitigation Measures and Potential Offsets	13-24
Table 13-5	Proposed Offset Strategy	13-26

Tables, Figures, & Appendices

Table 13-6	Summary of Mitigation Measures	13-27
Table 13-7	Potential impacts & mitigation measures for Matters of NES	13-29
Table 14-1	Indicative Water Demand Requirements	14-9
Table 14-2	Water Quality Criteria for Evaporative Cooling Make-up Water	14-11
Table 14-3	Summary of Water Supply Sources	14-21
Table 14-4	Summary of Potential Pretreatment Requirements for Water Supply Sources	14-23
Table 14-5	Overall Site Water Supply Requirements Assuming Groundwater Water Supply Source	14-23
Table 14-6	Evaporation Pond Indicative Sizing	14-27
Table 14-7	Pre-Development Catchment Areas and Design Inflows	14-28
Table 14-8	Pre and Post Development Site Catchment Yields	14-29
Table 14-9	Development Catchment Type and Area	14-30
Table 14-10	Developed Catchment Areas and Design Inflows (Stage 2)	14-30
Table 14-11	Summary of Mitigation Measures	14-33
Table 15-1	Site locations of relative to Facility Footprint	15-6
Table 15-2	Site locations of relative to Gas Pipeline and Access Road Easement	15-8
Table 15-3	Summary of Heritage Mitigation Measures	15-11
Table 16-1	Summary of current major projects in the Upper Lachlan Shire Council area	16-8
Table 17-1	Population and Projections	17-3
Table 17-2	Labour Force Status (2006 Census)	17-5
Table 17-3	Labour Requirements	17-8
Table 17-4	Economic Benefits - Leafs Gully Power Project	17-10
Table 17-5	Estimated Economic Benefits - Dalton Power Project Stage 1	17-10
Table 17-6	Total Estimated Economic Benefits for the Dalton Power Project	17-10
Table 18-1	Summary of Identified Hazards	18-6
Table 18-2	Summary of Hazard Mitigation Measures	18-11
Table 19-1	Summary of Mitigation Measures and Commitments	19-5
Table 20-1	Consistency of the Project with objects of the EP&A Act	20-3

Figures

Figure 1-1	Regional Location	1-3
Figure 1-2	Proposed Power Plant Site	1-4
Figure 1-3	Approvals Process under Part 3A of EP&A Act 1979 / EPBC Act 1999	1-7
Figure 2-1	Stylised NSW Network	2-4
Figure 3-1	AGL Energy – Installed Capacity Generation (Source: AGL 2008)	3-2
Figure 3-2	Assessment of Target Sites – Dalton Region	3-12
Figure 3-3	Assessment of Target Sites – Marulan	3-15
Figure 3-4	Assessment of Target Sites - Wagga Wagga	3-18
Figure 3-5	Assessment of Target Sites – Culcairn	3-22
Figure 3-6	Assessment of Target Sites - North Albury	3-25
Figure 3-7	Assessment of Target Sites - Central Coast	3-28
Figure 3-8	Assessment of Target Sites - Lithgow	3-31
Figure 3-9	Assessment of Target Sites - Moss Vale	3-33
Figure 3-10	Assessment of Target Sites - Canberra	3-36
Figure 3-11	Assessment of Target Sites – Nowra	3-39
Figure 3-12	Assessment of Target Sites – Wollongong	3-41
Figure 3-13	Alternative Facility Locations within Dalton Site	3-49
Figure 3-14	Infrastructure Options	3-50
Figure 3-15	Infrastructure Options - Vegetation Communities	3-52
Figure 3-16	Communications Tower Alternatives	3-60

Tables, Figures, & Appendices

Figure 4-1	Site Location	4-6
Figure 4-2	Indicative Site Layout.....	4-9
Figure 4-3	Indicative Site Concept Plan	4-10
Figure 4-4	Process Flow Diagram.....	4-11
Figure 4-5	Proposed Offset Area.....	4-29
Figure 5-1	Approvals Process for Dalton Power Project.....	5-3
Figure 8-1	Soil landscapes of the Project area	8-3
Figure 10-1	General Photo Location Plan	10-8
Figure 10-2	Panoramic Photographs 1	10-9
Figure 10-3	Panoramic Photographs 2	10-10
Figure 10-4	Panoramic Photographs 3	10-11
Figure 10-5	Panoramic Photographs 4	10-12
Figure 10-6	Panoramic Photographs 5	10-13
Figure 10-7	Photomontage for P1	10-15
Figure 10-8	Photomontage for P2	10-16
Figure 10-9	Photomontage of P4	10-17
Figure 10-10	Photomontage of P7	10-18
Figure 10-11	Photomontage of P16	10-19
Figure 10-12	Potential View Locations.....	10-21
Figure 11-1	Local Road Network.....	11-4
Figure 11-2	Main Connecting Roads to Site	11-5
Figure 12-1	Site and Noise Sensitive Receptor Locations.....	12-8
Figure 12-2	Monitoring locations used to measure existing road traffic noise	12-12
Figure 12-3	Noise Contours for Stage 2 – Operation of 6 “E” Class Machines	12-21
Figure 12-4	Noise Contours for Stage 2 – Operation of 6 “F” Class Machines	12-22
Figure 13-1	Vegetation Communities.....	13-11
Figure 13-2	Proposed Vegetation Offset.....	13-21
Figure 14-1	Lachlan River Catchment.....	14-5
Figure 14-2	Water Cycle.....	14-13
Figure 14-3	Proposed Surface Water Flow Regime.....	14-14
Figure 14-4	Comparison of Rainfall Data	14-32
Figure 15-1	Location of Aboriginal Sites within Study Area	15-7
Figure 17-1	Age Structure (2006 Census)	17-4
Figure 17-2	Proportion of Labour Force Participation by Age (2006 Census)	17-6
Figure 17-3	Industry of Employment (2006 Census).....	17-7
Figure 17-4	Occupation of Labour Force Participants (2006 Census).....	17-8
Figure 18-1	Individual Fatality Risk Contours.....	18-8
Figure 18-2	Individual Fatality Risk Transect for gas supply pipeline.....	18-9

Volume 2 – Appendices

Volume 2 Part 1

Appendix A	Director General's Requirements
Appendix B	Consultation
Appendix C	Air Quality Impact Assessment
Appendix D	Plume Rise Assessment
Appendix E	Greenhouse Gas Assessment
Appendix F	Transport Impact Assessment
Appendix G	Noise Impact Assessment

Volume 2 Part 2

Appendix H	Flora and Fauna
Appendix I	Heritage
Appendix J	PHA
Appendix K	Landscape and Visual

Notes on Text

Notes on Text

As a determination of the project will only be made after the Environmental Assessment has been on public display and submissions considered, the future conditional tense is used throughout this Environmental Assessment when describing the project, alternatives and assessing impacts. “Would” is, therefore, used throughout the text in preference to “will”.

If all approvals are given for the project to proceed, all “would” references should be interpreted as “will”, subject to final conditions of consent.



Making a Submission

Submissions from members of the public, government agencies and interest groups are invited and sought in response to this Environmental Assessment. This submission should include:

- your name and address;
- the name and application reference number (MP 10_0035) of the proposal;
- a statement on whether you support or object to the proposal; and
- the reasons why you support or object to the proposal.

Your submission should be addressed to:

Director, Major Infrastructure Assessment
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Fax: (02) 9228 6355

Email: Ingrid.Ilias@planning.nsw.gov.au

Under section 75H of the EP&A Act, the Director-General is required to provide copies of submissions received during the exhibition period, or a report of the issues raised in those submissions, to the Proponent and other interested public authorities. If you do not want your contact details to be made available to the Proponent or these public authorities, please state this in your submission.



Abbreviations

AADT	Annual Average Daily Traffic
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
AGL	Australian Gas Light Company
AGO	Australian Greenhouse Office
AHIMS	Australian Heritage Information Management System
AHC	Australian Heritage Commission
AHD	Australian Height Datum
ANEPM	National Environment Protection Measure for Ambient Air Quality
ANZECC	Australia and New Zealand Environment and Conservation Council
APZ	Asset Protection Zone
ARI	Annual Recurrence Interval
AWS	Automatic Weather Station
BCA	Building Code of Australia
BoM	Bureau of Meteorology
CASA	Civil Aviation and Safety Authority
CBNTCG	Cubbitch Barta Native Title Claimant Group
CCGT	Combined Cycle Gas Turbine
CEMP	Construction Environmental Management Plan
CFC	Chloro-Fluorocarbons
CO₂	Carbon dioxide
CO₂-e	Carbon dioxide equivalent
DA	Development Application
DCP	Development Control Plan
DEC	Department of Environment and Conservation (now known as Office of Environment and Heritage)
DECC	Department of Environment and Climate Change (now known as Office of Environment and Heritage)
DECCW	Department of Environment, Climate Change and Water (now known as Office of Environment and Heritage)
DoP	Department of Planning (now known as the Department of Planning and Infrastructure (DoPI))
DP	Deposited Plan
DoPI	Department of Planning and Infrastructure
EA	Environmental Assessment
ECMT	European Conference of Ministers of Transport
ECRTN	Environmental Criteria for Road Traffic Noise
EMF	Electric and Magnetic Field
EMP	Environmental Management Plan
EMS	Environmental Management Systems
ENCM	Environmental Noise Control Manual

Abbreviations

EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPA	NSW Environment Protection Authority
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPI	Environmental Planning Instrument
ERC	Emission Reduction Credits
ESD	Ecologically Sustainable Development
FDI	Fire Danger Index
GT	Gas Turbine
HAZID	Hazard Identification
HIPAP	Department of Planning's Hazardous Industry Planning Advisory Paper
HHV	Higher Heating Value
INP	Industrial Noise Policy (EPA, 2000)
IPA	Inner Protection Area (<i>Planning for Bush fire Protection RFS (2006)</i>)
IPCC	International Panel on Climate Change
ISO	International Standards Organisation
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
LHV	Lower Heating Value
LoS	Level of Service
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
NA	Not Applicable
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NGRS	National Greenhouse Response Strategy
NHMRC	National Health and Medical Research Council
NO₂	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NP&W Act	NSW <i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
O₃	Ozone
OCGT	Open Cycle Gas Turbine
OEMP	Operation Environmental Management Plan
OLALC	Onerwal Local Aboriginal Land Council
OPA	Outer Protection Area (<i>Planning for Bush fire Protection RFS (2006)</i>)
PAD	potential archaeological deposit
PAH	Polycyclic Aromatic Hydrocarbons
PASS	Potential Acid Sulphate Soils

Abbreviations

PBP	<i>Planning for Bush fire Protection RFS (2006)</i>
PFM	Planning Focus Meeting
PHA	Preliminary Hazard Analysis
PM₁₀	Particles effectively less than 10µm diameter
PM_{2.5}	Particles effectively less than 2.5µm diameter
POEO Act	<i>NSW Protection of the Environment Operations Act 1997</i>
REP	Regional Environmental Plan
RET	Renewable Energy Target
RFI Act	<i>NSW Rivers and Foreshores Improvements Act 1948</i>
RNE	Register of the National Estate
ROTAP	Rare or Threatened Australian Plants
RPM	Revolutions per Minute
RTA	NSW Roads and Traffic Authority
SCAQMD	South Coast Air Quality Management District
SCR	Selective Catalytic Reduction
SEDA	Sustainable Energy Development Authority
SEPP	State Environmental Planning Policy
SEWPAC	The Australian Government Department of Sustainability, Environment, Water, Population and Communities
SIS	Species Impact Statement
SO₂	Sulphur dioxide
SO_x	Sulphur Oxides
TAPM	The Air Pollution Model
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TSC Act	<i>NSW Threatened Species Conservation Act 1995</i>
TSP	Total suspended particulate
TSP Act	NSW Threatened Species Act 1995
TSS	total suspended sediment
VOC	Volatile Organic Compound
WM Act	Water Management Act 2000

Abbreviations

UNITS

µm	Microns
Cm	centimetres
G	Grams
GL	Gigalitre (10 ⁹ L or 10 ⁶ m ³)
GWh	Gigawatt Hour
ha	hectare
Hr	Hour
Hz	Hertz
Kg	Kilograms
KJ	Kilojoules
KL	Kilolitre (10 ³ L or 1 m ³)
Km	Kilometre
Km/hr	Kilometres per hour
KPa	Kilopascals
KV	Kilovolts
KW	Kilowatts
M	Metres
Mg	Milligrams
m²	square metres
m³	cubic metres
MHz	Megahertz
ML	Meglitre (10 ⁶ L or 10 ³ m ³)
MW	Megawatts
Pa	per annum
Ppm	Parts per million
Pmpy	per million per year
S	second
Sg	Density
T	Tonne
Yr	Year

Glossary

Aboriginal archaeological site (Aboriginal site)	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.
acid sulphate soils (ASS)	Soils containing pyrite which produces sulphuric acid when exposed to oxygen.
ambient	Surrounding environment.
ambient noise	The all-encompassing sound at a site comprising all sources such as industry, traffic, domestic, and natural noises. This is represented as the L_{Aeq} noise level in environmental noise assessment. (See also L_{Aeq})
Approved Methods	<i>Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2005)</i>
aquifer	Rock formation containing water in recoverable quantities.
background scatter	Aboriginal artefacts that cannot be usefully related to a place or focus of past activity.
biodiversity	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.
Biobanking	<p>The NSW Government is introducing the Biodiversity Banking and Offsets Scheme (or 'BioBanking') to help address the loss of biodiversity values, including threatened species.</p> <p>BioBanking is a market-based scheme that provides a streamlined biodiversity assessment process, a rigorous and credible offsetting scheme.</p> <p>BioBanking enables 'biodiversity credits' to be generated by landowners who commit to enhance and protect biodiversity values on their land through a biobanking agreement.</p> <p>The details of the scheme have not yet been finalised.</p>
bunds	An earthwork or wall to contain and control spillages, normally associated with tank farms, fuelling and chemical storage facilities.
burial site	Usually a sub-surface pit containing human remains and sometimes associated artefacts.
Bush fire Guideline	<i>Planning for Bush fire Protection (RFS 2006)</i>
CO₂-e	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 ₄) has a GWP of 21, meaning that a release of 100 tonnes of CH ₄ would be the equivalent to releasing 2100 tonnes of CO ₂ in terms of global warming.
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.
conservation	The management of natural resources in a way that will benefit both present and future generations.
cumulative effect	Refers to the accumulation of effects over time.

Glossary

dB(A)	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 (eg the loudness of human speech and a distant motorbike may be perceived differently, although they are of the same dBA level).
dB(C)	The C-Weighting has a relatively flat response. C- weighting is used in evaluating annoying community noises such as low frequency sound.
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.
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.
environment	The physical, biological, cultural, economic and social characteristics of an area, region or site.
Environmental Assessment	The orderly and systematic evaluation of a proposal, including alternatives and objectives, and its effects on the environment, including the mitigation and management of these effects.
environmental management	That part of the overall management system which includes organisational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining environmental policy. (Refer to related term Environmental Management System).
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. Prepared within the framework of Defence policies, objectives, strategies and actions.
Environmental Management System	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.

Glossary

fauna	Animals.
fire fence	A gap in vegetation or fuels which prevents or hinders the spread of fire.
flora	Plants.
floristic composition	The plant species present in a particular community, sub-community or site.
free ammonia	The toxic fraction of ammonia (NH ₃) that is undissociated and therefore available for uptake by organisms. The usual source of ammonia to waterways is domestic sewage and industrial effluents.
geotechnical	Relating to the form, arrangement and structure of the geology.
GGAS	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.
geotechnical	Relating to the form, arrangement and structure of the geology.
Greenhouse Gas	A gas which has an effect on the radioactive absorptivity of the earth's atmosphere and the atmosphere's temperature.
Greenhouse Challenge Plus	The programme integrates the Generator Efficiency Standards and the Greenhouse Friendly TM initiative into a single industry programme, focused on reducing greenhouse gas, promoting energy efficiency, integrating greenhouse issues into decision making and allowing for a consistent manner for reporting greenhouse gas emissions.
Greenhouse Effect	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.
Greenhouse gas intensity	the amount of greenhouse gases per unit of energy produced from a power station (eg in units of kg CO ₂ -e/MWh)
groundwater	Subsurface water contained within the saturated zone.
heritage (cultural heritage)	A term which encompasses Aboriginal and post-contact archaeological sites and material remains (cultural resources).
higher heating value	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.
Hydrocarbons	A class or compounds containing only carbon and hydrogen in various structures. Both naturally occurring and from anthropogenic sources.
Hydrology	Surface water and groundwater and their interaction with earth materials.
Hydrogeology	The study of subsurface water in its geological context.
INTANAL	Specialist traffic model for intersection analysis
Invertebrate	An animal without a backbone.
Isolated find	Single stone artefact, not located within a rock shelter which occurs without any associated evidence of Aboriginal occupation within a radius of 60 m.

Glossary

LA1	The noise level exceeded for 1% of the 15 minute interval.
LA10	The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
LA90	The LA90 level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the LA90 level for 10% of the time. This measure is commonly referred to as the background noise level.
LAeq	The equivalent continuous sound level (LAeq) 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.
LAeq (1hr)	The LAeq noise level for a one hour period.
LAeq (15 hr)	The LAeq noise level for the period 7am to 10pm.
LAeq (9 hr)	The LAeq noise level for the period 10pm to 7am.
Leq	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.
Level of Service	A description of the operating performance of a road or intersection as defined in Austroads 'Guide to Traffic Engineering Practice, Pt 2 – Road Capacity.'
Lithologies	Rock types
Lower heating value	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.
mean	The sum of n values divided by n.
median	The middle value of a set of values.
middens	Evidence of Aboriginal occupation of an area.
monitoring	The checking of impacts of a proposal or an existing activity in order to improve or evaluate environmental management practices. To check the efficiency and effectiveness of the environmental impact assessment process. To determine if the requirements of environmental legislation and associated regulations are being met.
native vegetation	A broad term for vegetation comprised of plant species which occur naturally in Australia (but which are not necessarily indigenous).
natural gas	Combustible gas formed naturally in the earth.
Organochlorines	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.
Operation 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.
Ozone	A form of oxygen having three atoms to the molecule. Ozone is a powerful oxidising agent.

Glossary

Particulate	Small particles, usually in suspension.
Petroleum hydrocarbons [total petroleum hydrocarbons (TPH)]	A class of organic compounds arising from unburnt fuel sources.
Piles	Type of foundation using columns of concrete, steel or timber.
Plume	Area of impact extending from a source.
Polycyclic aromatic hydrocarbons (PAH)	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.
potable water	Water suitable for drinking.
potential acid sulphate soil (PASS)	Soil material which is waterlogged and contains oxidisable sulphur compounds, usually iron sulphide (pyrite) that has a field pH of 4 or more (1:5 soil:water).
Rating Background Level (RBL)	A single number representing the median value of the ABL values of each assessment period over all of the monitoring days.
Register of the National Estate	A list of the National Estate developed under the provisions of the Commonwealth's Australian Heritage Commission Act 1975.
risk	Likelihood of a specific undesirable event occurring within a specified period or in specified circumstances. Listed as a frequency or probability.
risk assessment	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.
security fence	A fence designed to prevent unlawful intrusion to a prohibited area.
sediment/detention pond	Artificial earthen depression to retain water runoff for a period of time so as to control high intensity runoff.
sustainable use	Use of organism, ecosystem or their renewable resource at a rate within its capacity for renewal.
TAPM	The Air Pollution Model is an air quality dispersion model developed by the Commonwealth Scientific Investigation & Research Organisation.
terrestrial	Of or pertaining to the land as distinct from the water.
thermal efficiency	The proportion of energy converted from the fuel to electricity in the generation process is an indication of CO ₂ emissions.
total aromatic hydrocarbons	A class of organic chemicals which contain an aromatic ring (e.g. benzene, anthracene, naphthalene and their derivatives). Used in chemical and pharmaceutical industries.
total organic carbon (TOC)	The amount of carbon in the organic form contained in a sample, measured as a percentage.
total suspended solids (TSS)	Total load of particulates in water, measured in mg/L.
turbidity	Liquid's ability to intercept light. Measured in nephelometric turbidity units (NTU). Cannot be consistently correlated with the concentration of suspended matter.
visibility	Measure of extent to which particular components of a development may be visible from surrounding areas.
visual absorption capacity	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.

Glossary

volatiles	Any chemical compound which will evaporate quickly due to its low boiling point.
vulnerable species	Those that may soon become endangered unless action is taken.
waders	Synonymous with shorebirds.
weed	Naturalised, non-indigenous plant species which may be noxious weeds (or agriculture), environmental weeds or any other generally undesirable introduced species.
wetlands	Areas largely inundated with water, yet offering elevated land as a habitat for wildlife, notably waterfowl. Can be landlocked.
wind climate	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.