CENTRAL WEST COAL PROJECT

PROPONENT'S RESPONSE TO SUBMISSIONS

2009

AVIVA CORPORATION LTD

TABLE OF CONTENTS

1. INTRODUCTION

1.1. The Proposal

Central West Coal Pty Ltd (CWC) proposes to develop the Central West Coal Project (the "Project" or "CWC") located approximately 15 km south-west of Eneabba. The Project is based on the mining of the Central West Coal Deposit as an energy source for the adjacent proposed Coolimba Power Station. The resource comprises a 75 million tonne (Mt) sub-bituminous coal deposit approximately 12 km long and ranging from 0.27 to 2 km wide.

The main components of the proposed Project comprise:

- Open cut mine;
- Waste dump;
- Mine backfill with co-disposal of coal combustion ash and saline residue;
- Stockpile management corridor (SMC);
- Run-of-Mine (ROM) pad;
- Coal handling plant and coal stockpiles;
- Access roads;
- Raw water storage dam;
- Dewatering bores and associated pipelines;
- Laydown areas;
- Workshop;
- Stores
- Fuel storage;
- Borrow pits;
- Landfill; and
- Administration offices.

Mining will occur progressively and will comprise an open-cut mine to extract approximately 2 to 2.5 million tonnes per annum (Mtpa) of sub-bituminous coal. Based on the current estimate of reserves, the anticipated life of the mine is 30 years.

The mine will progress along the orebody with an active excavation area of approximately 120 ha at any one time, with a progressive backfill and rehabilitation programme. During the mine development phase, waste rock will be placed in a waste rock dump until the open cut pit is established and then the majority of waste rock will be used to backfill the pit. The Stockpile Management Corridor (SMC) will be used for management of the various material stocks including topsoil, waste and coal. The coal will be trucked to the ROM area, crushed, screened and stockpiled ready to be conveyed to the power station. The complete project description is provided in Section 3 of the PER issued in April 2009.

1.2. The Environmental Approval Assessment Process

1.2.1. Western Australian Environmental Impact Assessment Process

The purpose of the Western Australian environmental assessment process is to provide information to the relevant Decision Making Authorities (DMAs), as well as to the public, about proposed developments that may impact on the natural and social environment. The environmental approval process and where the project is up to in the process is illustrated in Figure 1.

The environmental referral for the Project was submitted to the Environmental Protection Authority (EPA) on 3 September 2007 and the EPA set the level of assessment at a Public Environmental Review (PER) level. Appeals on the level of assessment were received in October 2007, and on 8 January 2008 the WA Minister for the Environment overruled the appeals and confirmed the level of assessment at PER with a public review period of eight weeks.

CWC, in consultation with the EPA and other relevant DMAs, prepared an Environmental Scoping Document (ESD), as required under Section 6.1 of the Environmental Impact Assessment Administrative Procedures 2002, and submitted it to the EPA. The ESD outlined the intended scope of work and the environmental issues that should be addressed in the PER. The ESD was approved by the EPA in August 2008 and by the DEWHA in November 2008.

The PER was made available for public comment for an eight week period closing on 23 June 2009. During this time, government agencies, private organisations, community groups and the public were invited to make submissions to the EPA in relation to the Project. The submissions received during this time are listed in Section 3 and the responses of the Project to the matters raised in those submissions are included in Section 4 to 7 of this document.

These submissions and this response to submissions along with the PER will now be considered by the EPA as part of its assessment of the Project.

1.2.2. Commonwealth Environmental Impact Assessment Process

Under the EPBC Act, an action requires approval from the Commonwealth Minister for the Environment, Water, Heritage and the Arts if the action has, will have, or is likely to have a significant impact on any Matters of National Environmental Significance (MNES). The MNES are:

- World Heritage Properties;
- National Heritage places;
- Ramsar wetlands of international significance;
- Nationally listed threatened species and ecological communities;
- Listed migratory species;

- Commonwealth marine areas; and
- Nuclear actions.

On 22 November 2007, CWC referred the Project to the Commonwealth Minister for the Environment, Heritage and the Arts (EPBC Ref: 2007/3869) as the Project may impact on the following listed threatened and migratory fauna species.

- Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*);
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*);
- Rainbow Bee-eater (*Merops ornatus*);
- Great Egret (*Ardea alba*);
- Cattle Egret (*Ardea ibis*); and
- Fork-tailed Swift (*Apus pacificus*).

Following this referral, the DEWHA deemed the proposal a 'controlled action' and that it will be assessed in accordance with the "Agreement between the Commonwealth of Australia and WA under Section 45 of the EPBC Act Relating to the Environmental Impact Assessment (the Bilateral Agreement) and in conformance with the Cooperative Arrangements to the Bilateral". This means that the environmental assessment undertaken by the State for this Project is accredited by the Commonwealth.

Following its review of the PER and other relevant documentation, the DEWHA then prepares an assessment report for its Minister.

If the Commonwealth Minister for the Environment, Water, Heritage and the Arts decides to approve the Project, CWC will be notified and the decision published.

This approval, under the EPBC Act, is a separate approval to that issued by the WA Minister for the Environment under the WA *Environmental Protection Act 1986*. Consequently, if approved, the Project will need to comply with both State and Commonwealth conditions of approval.

Figure 1 shows this process and where the project is up to in the process.

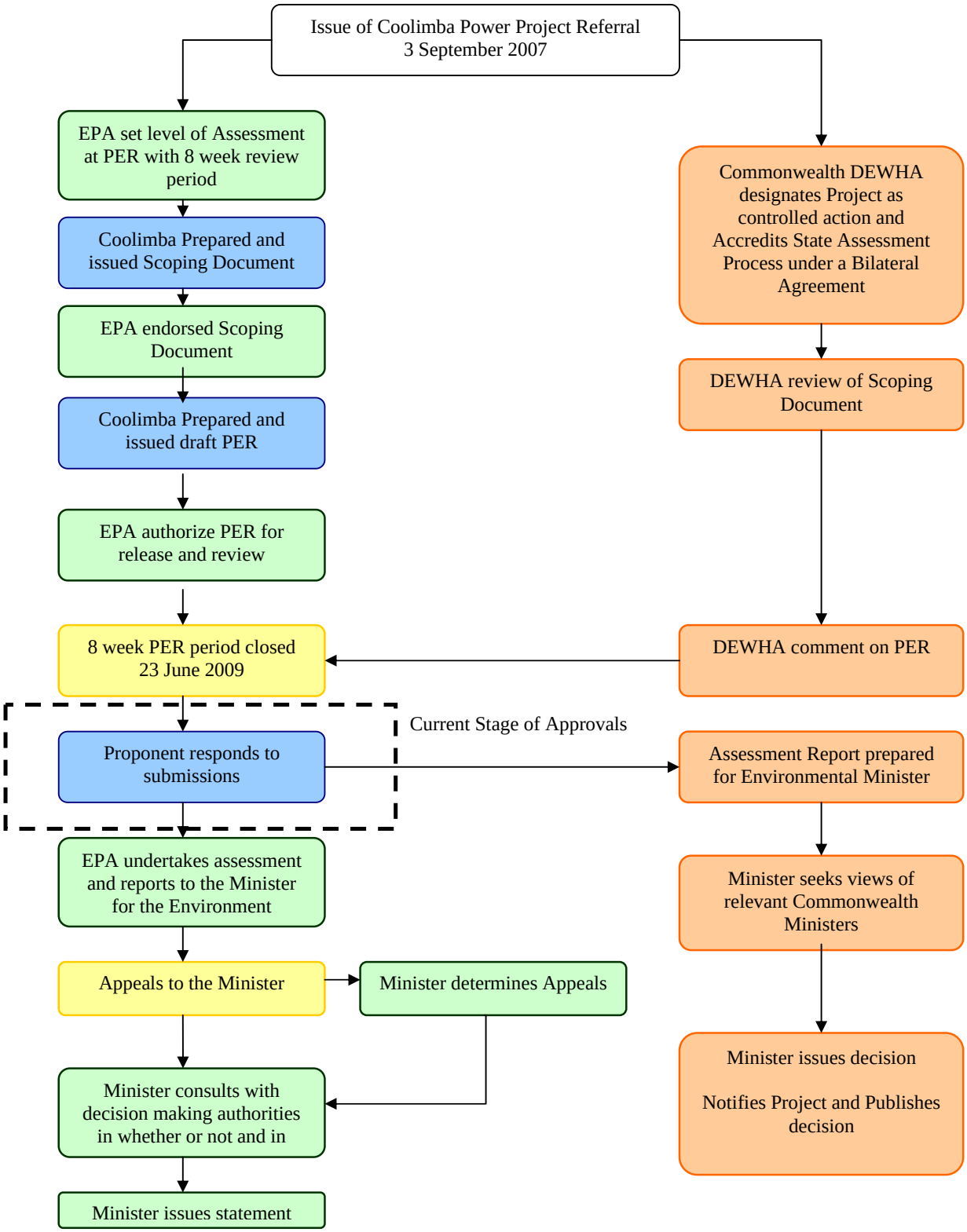


Figure 1- WA and Commonwealth Environmental Approvals Process

1.3. Purpose and Scope of this Document

The Environmental Impact Assessment (Part IV Division 1) Administrative Procedures (2002) state that the Proponent is required to:

- prepare a summary of the matters raised in public and government agency submissions;
- respond in writing to the issues raised in public and government agency submissions and any other issues the EPA may consider need to be addressed; and
- amend the proposal and change environmental commitments where appropriate.

The purpose of this Response to Submissions document is to provide a summary of the key matters raised in public and government agency submissions and the Projects response to those matters. Matters raised in submissions have been addressed and collated according to the environmental factor they addressed (e.g. Flora, Fauna, Air Emissions etc). A response has been prepared for each key matter raised.

The summary and response to submissions will be considered by the EPA and DEWHA during their assessment of the proposal.

1.4. Structure of Document

The Response to Submissions document has been structured as follows:

♦ **Section 1 – Introduction**: provides background on the Project, the environmental assessment process and the purpose and structure of this document.

♦ **Section 2 – Project Updates**: outlines changes to the Revised Proposal that have occurred since the release of the PER for public review, and provides an assessment of the revised environmental impacts of these proposed changes.

♦ **Section 3 – Public Submissions**: outlines the submissions received on the PER.

♦ **Sections 4 to 7 – Response to Submissions**: provides responses to key issues raised during the public submission period. The responses to submissions have been structured according to the categories and environmental factors identified in the PER.

♦ **Section 8 – References**: provides a list of references used in the preparation of this Response to Submissions.

2. PROJECT UPDATE

2.1. Changes to the Project

Refining the design of the CWC Project is an ongoing process with the aim of ensuring optimum design with minimal impacts. Whilst design change is inevitable it is always done in search of improvement in environment and other outcomes.

Despite the continuous design review there have been no significant project design changes since the release of the PER for Public Review.

There are no proposed changes to the project however, the identification of Grevillea althoferorum subsp. althoferorum since the issue of the PER has led CWC to conduct additional survey work to determine the extent of the population of Grevillea althoferorum subsp. althoferorum. This survey work is not yet complete but when it is it will be included in an assessment of the required project changes to make the proposal mutually satisfactory to the DEC and CWC.

2.2. Revised Environmental Impacts

After the release of the CWC PER, Iluka Resources performed further flora survey work in the area of the mine footprint and surrounds. This survey work identified a Declared Rare Flora taxa being Grevillea althoferorum subsp. althoferorum, inside and outside the CWC Project area.

A jointly funded study between Iluka Resources and Aviva Corporation has determined that there are approximately five additional populations of the DRF species Grevillea althoferorum subsp. althoferorum located in the area of the CWC Project. Some of these populations are within the CWC Project area as defined in the PER and some are within the SENR.

The five additional populations (found subsequent to the PER issue) are considerably larger than the five (quite small) populations that were known about before the release of the PER. In summary the known number of plants of this species is now much greater than before however the impact on the known number is also greater as some have been found in the Project area and will require disturbance as part of the mining activity. The Project area defined in the PER has been revised to minimise the impact to this DRF species.

The current environmental impact should the project continue with its current design would be to remove a portion of the currently known population of Grevillea althoferorum subsp. althoferorum.

Grevillea althoferorum subsp. althoferorum was not considered to be an impact in the CWC PER as it was not known to exist within the project area prior to the release of the PER.

Further discussion of this DRF taxa is included in Section 5.

2.3. Revised Environmental Commitments

Section 11 of the PER listed the environmental commitments of the project.

As a result of reviewing the submissions and preparing these responses some variations have been made to these commitments.

The current set of commitments is included below.

Environmental Management Commitments – Updated for Response to Submissions					
Subject	Section	No.	Proposed Actions	Project Phase	On Advice From
Vegetation	7.2.3	1	CWC commits to providing an offset of 861 ha of remnant vegetation for the vegetation clearing in the project area. The offset will be negotiated with the DEC.	Prior to commencement of development	DEC
Vegetation	7.2.3	2	CWC will undertake further field studies to extend vegetation surveys outside the project area and incorporate areas of potential impact from groundwater drawdown.	Prior to commencement of development	DEC
Flora	7.3.3	3	CWC will undertake further field studies to assist in locating any additional populations of Priority Flora species outside the Project Area. The location and numbers of additional populations found will be reported to DEC. Further surveys of Priority and DRF flora were conducted in Spring 2009 and Autumn 2010. Impacts and management mitigation options were discussed with DEC following these surveys. This included surveys for Grevillea *althoferorum subsp. Althoferorum*. CWC has revised its project footprint to protect some of the individual plants of Grevillea *althoferorum subsp. althoferorum* located in the Project area. Further CWC commits to no direct disturbance on any individual Grevillea *althoferorum subsp. althoferorum* plants that are along the western boundary of the SENR or within the dewatering infrastructure corridor part of the project footprint. CWC commits to a research program to address the knowledge of Grevillea *althoferorum subsp. althoferorum* and the most suitable rehabilitation techniques for successful rehabilitation of Grevillea *althoferorum subsp. althoferorum*, in consultation with specialists from Kings Park Botanic Gardens.	Continuous through out the Project	DEC

Environmental Management Commitments – Updated for Response to Submissions					
Subject	Section	No.	Proposed Actions	Project Phase	On Advice From
			CWC commits to providing an appropriate offset for any clearing of DRF. The required offset will be negotiated with the DEC. Further surveys of Priority and DRF flora were conducted in Spring 2009 and Autumn 2010. Impacts and management mitigation options will be discussed with DEC following these surveys.		
Groundwater Dependent Ecosystems	7.4.3	4	CWC will undertake further field studies and monitoring to determine the likelihood of Erindoon and Bindoon Creek being groundwater dependant. Studies into the connection between surface and subsurface water flows in the Erindoon and Bindoon Creeks and their relationship to groundwater will be conducted and reported to the DoW. If these studies show that Erindoon and or Bindoon creeks are groundwater dependant and that there will be a loss of biological value from the dewatering activities impact on these creeks then CWC will investigate the biological values for both the Erindoon and Bindoon creeks and the downstream Lake Indoon. This investigation will cover appropriate management processes for the ecological water requirements of these features based on water quality and quantity.	Prior to commencement of development	DEC

Environmental Management Commitments – Updated for Response to Submissions					
Subject	Section	No.	Proposed Actions	Project Phase	On Advice From
Groundwater Dependent Ecosystems	7.4.3	5	CWC will undertake to work with the DoW and DEC to more accurately identify the GDEs in the project area and surrounding zone of influence of project dewatering. CWC will then work with the DoW and DEC to survey those GDEs identified to provide a more accurate description of the GDEs. CWC will undertake to monitor the health of the following potential GDEs and report the monitored health and the monitored groundwater levels surrounding each of the GDEs to the DEC on an annual basis. Further, CWC will agree appropriate triggers with the DEC to identify when contingency measures (based on the health of the GDE) are required. • Lake Indoon – monitor ground water levels to determine if there is any groundwater drawdown; • Bindoon and Erindoon Creeks – monitor water flow and water quality; • Lake Logue Nature Reserve (LLNR) – monitor health of vegetation and groundwater level; • Rocky Spring TEC – monitor health of vegetation and groundwater level; and • South Eneabba Nature Reserve (SENR) (west of Brand Highway) – monitor health of vegetation and groundwater level. The vegetation monitoring component will include a combination of transects and permanent plots located in the representative areas (as highlighted above). Measurements on vegetation will include standard measurements on numbers and cover of plants as well as overall condition of the plants. This data will then be correlated with groundwater data and general climate data as part of the integrated approach. CWC will develop contingency plans to manage the potential impacts from dewatering on GDEs including details of where the water will be obtained to "supplement" groundwater levels for GDEs.	Continuous throughout the Project	DEC

Environmental Management Commitments – Updated for Response to Submissions					
Subject	Section	No.	Proposed Actions	Project Phase	On Advice From
Dieback	7.5.3	6	CWC will implement vehicle hygiene procedures to minimise potential spread of dieback and conduct an inspection throughout the project area at periodic intervals during construction and operations for the presence of the disease. In the event that dieback is detected, CWC will determine appropriate management in consultation with DEC.	Continuous throughout the Project	DEC
Landform and Soils	7.6.3	7	CWC will undertake on-going soils characterisation to provide input to the Preliminary Closure Plan and Draft Progressive Rehabilitation Plans for the CWC Project.	Continuous throughout the Project	DEC

Environmental Management Commitments – Updated for Response to Submissions					
Subject	Section	No.	Proposed Actions	Project Phase	On Advice From
Water	7.7.3 7.8.3 8.2.3	8	CWC will extend the groundwater monitoring bore network and develop the groundwater model to: • Accurately monitor the response of affected aquifers to mine de-watering, especially the superficial aquifer which may provide domestic and stock drinking water to neighbours o This will include the dewatering bore field area, the Cattamarra coal measures aquifer, the Yarragadee aquifer and the superficial aquifer in the affected area. • Confirm the predictions of changes to groundwater quality and watertable drawdown o This will include further modelling to include thermal gradient effects, plume density effects, and more precise final pit void geometry to confirm the effects of saline residue co-disposal and to confirm the predicted long term environmental outcomes prior to adopting disposal practices that would allow saline residue to be transported to the final void. • Confirm the relationship between stream flows and groundwater recharge and the extent to which sub-surface flows in palaeo drainages and is important in the maintenance of soil moisture levels in so far as that supports plant growth. In addition CWC will: • Develop a satisfactory set of triggers based on groundwater level changes. • Develop a satisfactory contingency plan. • Reach a satisfactory agreement with those local agriculturalists that may potentially be impacted by the groundwater drawdown from the dewatering activity.	Continuous throughout the Project	DEC, DoW

Environmental Management Commitments – Updated for Response to Submissions					
Subject	Section	No.	Proposed Actions	Project Phase	On Advice From
Vertebrate Fauna	7.9.3	9	CWC will conduct annual regional surveys for Carnaby's Black-Cockatoo. This will include compilation of any sightings of the cockatoo. The results of these activities will be reported to relevant stakeholders.	Continuous throughout the Project	DEC
Acid Mine Drainage	8.3.3	10	CWC will conduct further testing program to confirm the AMD potential of waste rock, coal and coal reject materials and combustion ash material and further refine the development of management strategies to address any potential impacts if required.	Continuous throughout the Project	DEC
Noise	8.6.3	11	CWC commits to investigating and implementing the most effective noise attenuation measures during the detailed design phase so that the noise impacts experienced by sensitive receptors are as low as reasonably achievable.	Prior to construction and continuous throughout the Project	DEC
	8.6.3	12	CWC will monitor background noise at sensitive receptors prior to construction and operation, and will monitor noise levels through commissioning and operation to allow validation of the noise assessment.	Prior to commencement of construction	DEC
Community and Social	9.1.4	13	CWC will work with the relevant stakeholders to have a positive legacy on the community within the region.	Continuous throughout the Project	DEC, local shires and communities
Visual Amenity	9.9.3	14	CWC will use directional lighting and screening vegetation, where appropriate, to reduce impacts on visual amenity.	Continuous throughout the Project	DEC
Aboriginal Heritage	9.4.3	15	CWC will consult with Traditional Owners and will seek all relevant approvals under the *Aboriginal Heritage Act 1972* in the event that disturbance of an Aboriginal heritage site is required.	Continuous throughout the Project	DIA and Heritage Groups

Environmental Management Commitments – Updated for Response to Submissions					
Subject	Section	No.	Proposed Actions	Project Phase	On Advice From
	9.4.3	16	CWC will undertake ongoing consultation with the Yued, Amangu and Franks groups and additional Aboriginal heritage surveys will occur for any future proposed works.	Continuous throughout the Project	DIA and Heritage Groups

3. PUBLIC SUBMISSIONS RECEIVED

A total of ten submissions related to the PER were received as follows:

Government agencies (6):

Department of Environment, Water, Heritage and the Arts

Department of Environment and Conservation (DEC)
- Environmental Management Branch
- Air Quality Management Branch
- Noise Regulation Branch
- Office of Climate Change
- Midwest Region
- Terrestrial Ecosystems Branch

Department of Health (DoH)

Department of Water (DoW)

Department of Indigenous Affairs (DIA)

Shire of Coorow

Non-government and/or community group organisations (2):

Conservation Council of Western Australia Inc

Wildflower Society of Western Australia (Inc)

Individual (private) (2):

Anonymity requested.

CWC would like to acknowledge all groups that chose to forward a submission to the EPA as part of this environmental impact assessment process. CWC has responded to each question or issue raised in the submissions with the most accurate information currently available in relation to the issues.

4. RESPONSE TO GENERAL ISSUES RAISED IN SUBMISSIONS

Issue 4.1

"… the document does not provide sufficient information to enable an informed assessment of all the potential (direct and indirect) impacts on the high biodiversity values potentially impacted by the proposal."

"The documentation presented in the PER contains significant deficiencies in relation to the level of detail presented and the associated potential environmental impact. As a result, the Department is unable to adequately assess the likely scale and extent of the potential environmental impact of this project. Based on the information presented, the Midwest Region of DEC considers that the proponent has not adequately demonstrated that impact associated with the Coolimba Power Project has been sufficiently investigated in order to undertake an environmental impact assessment."

Raised by the Department of Environment and Conservation

Response

The CWC PER provides adequate information to allow an assessment of the existing environment that the project will impact on, the potential environmental impacts of the project and the management, mitigation and remaining impacts of the project on the environment. Where there has been scientific uncertainty of the extent of an impact, the guiding principles of the conservation of biological diversity and ecological integrity, the principle of intergenerational equity and the precautionary principle have been followed.

CWC has prepared the PER after extensive consultation with the DEC and others and the PER was released after approval of the EPA considering the input from the DEC and others on the ESD and the Draft PER document.

The key environmental and social issues associated with the proposed Project are outlined below. CWC considers that these issues can be adequately managed through the implementation of the Environmental Management Plan developed specifically to address these aspects. An Environmental Management System will be implemented during the operations phase. A Preliminary Closure Plan and Draft Rehabilitation Plan have been developed for the Project and will be reviewed and revised where necessary throughout operations.

The project area is within a highly diverse bioregion. A large number of baseline biological studies have been completed (refer below). As a result of these studies, it is known that the project area and surrounds include:

- 17 different plant communities defined (although 49% of the project area was cleared);
- 512 flora taxa (recorded over the entire study area);
- one DRF species (*Grevillea althoferorum* subsp. *althoferorum*) recorded;
- four Priority 2, eight Priority 3 and four Priority 4 flora species found;
- 11 native mammals, 4 introduced mammals, 31 bird species (including three of conservation significance), 22 reptile species (including one of conservation significance) and three amphibian species found;
- 12 species of invertebrate and SRE fauna recorded; and
- An undescribed bathynellid syncarid (*Bathynellidae* sp. 1).

Of the environmental and social issues potentially associated with the proposed Project, the most significant issues are likely to be:

- Clearing of approximately 861 ha of remnant vegetation (some of which occurs adjacent to the SENR). This clearing will include the removal of selected individuals of Priority Flora.
- Potential for changes to surface water quantity and quality affecting downstream ecosystems.
- Potential for Groundwater Dependant Ecosystems (GDEs) including Threatened Ecological Communities (TECs) to be indirectly affected by groundwater drawdown caused by pit dewatering. No TECs are located within the project area. One TEC is known to occur in the general Eneabba area and is known as Community 72 Ferricrete Floristic Community (the Rocky Springs Ferricrete Community). This TEC is listed as Vulnerable by the DEC (2008c), but is not currently listed under the Commonwealth EPBC Act. This community is unlikely to be affected directly by the Project and it is not considered to be groundwater dependent so it is unlikely to be affected indirectly by groundwater drawdown due to pit dewatering.
- Potential for groundwater drawdown and quality changes to affect local water supplies, notably Eneabba's water supply (however this is considered extremely unlikely due to distance and barriers between aquifers), and a small number of domestic and stockwater supplies near the mine.
- Potential for groundwater contamination by leaching of mine backfill, and of ash and saline power station residues co-disposed with mine backfill.
- Impacts relating to water quality in the lake formed in the mine void after mine closure.
- Potential for clearing to impact on fauna. A number of species with elevated conservation status were recorded in surveys commissioned by CWC, including Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris)* and the Rainbow Bee-eater (*Merops ornatus*), both of which are protected under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act),* the Rufous Fieldwren *(Calamanthus campestris montanellus, western wheatbelt population),* and the Black-striped Snake *(Neelaps calonotos)* which are listed as Priority 4 and Priority 3 species respectively on DEC's Declared Threatened and Priority Fauna List. A number of other species of elevated conservation status have been recorded in the locality in previous surveys and may continue to use the area.
- Potential to impact on a number of subterranean fauna species including an un-described Syncarida, Bathynellidae sp., however a risk assessment by Bennelongia has concluded that the risk posed by the Project to the species of Bathynellidae appears to be minimal.
- Potential for dust from mining operations to impact on local receptors.
- Potential for noise from mining operations to impact on local receptors.
- Potential for dieback disease spread caused by disturbances to surface water flow regimes, and by uncontrolled traffic movement.

Where there has been uncertainty of impact CWC has committed to determining the precise impacts and determining appropriate management methods (Table 11 – 1, CWC PER), and plans to modify or add to these management plans as new data comes to light. For example, after the production of the PER, *Grevillea althoferorum* subsp. *althoferorum* (a DRF species) was found inside the proposed project footprint. CWC has conducted further surveys of the SENR looking specifically for *Grevillea althoferorum* subsp. *althoferorum* and has been successful in doing so (survey data is still being compiled and will be provided when available). CWC will discuss with the DEC the appropriate changes to its mitigation and management plans when reporting on these surveys is complete. It is not the intention of the proponent to change the local conservation status of species or ecosystems. In order to define these impacts more precisely it is proposed to carry out the following studies this year;

- Additional DRF searches will be carried out for *Paracaleana dixonii* and *Thelymitra stellata, Eucalyptus crispata, Eucalyptus impensa, Eucalyptus johnsonia* and *Grevillea althoferorum* subsp. *althoferorum*. This work will also include searches of populations on and off proposed impact sites, including counting of plant numbers.

- Additional Priority flora species searches will be carried out to expand on current knowledge and to enable plant numbers to be recorded both on and off the potential impact sites.

- More detailed mapping through regular gridding of the Lake Logue and South Eneabba reserve areas. Secondly, the establishment of permanent vegetation plots (which can also be used for assessing longer term trends) in a range of locations on the creeklines and near the TEC.

- Monitoring sites (including transects) will be established on the TEC community on Rocky Spring Road. This will entail coverage of the variety of communities near the DEC designated site and will provide more detail clarity on the issues associated with this TEC.

Although the project area is in a highly diverse biological area, the position of CWC is that ecological integrity at a local or regional scale will not be significantly negatively impacted. At a local level it appears that the extent of vegetation communities (including the H1 community – which is considered by DEC to be similar to the Rocky Springs TEC) types extend out of the project area and into secure conservation estate (such as Lake Logue Reserve). On a regional scale, CWC is of the position that the impact on the amount of remnant vegetation in the Eridoon and Tathra (Beard 1979) systems is minimal, and this project gives an opportunity to contribute to a Comprehensive Adequate Reserve system by the addition of an appropriate offset.

The following environmental outcomes are predicted in relation to biodiversity:

- No loss of flora or fauna species.
- No change in conservation status of flora or fauna species.
- No significant impact on on TECs and PECs.
- No significant impact on regional biodiversity, though localised reduction of some local biodiversity values will occur.

A large number of baseline biological studies have been completed and reported on or included in the PER. These include the following studies.

Geotechnical Assessment
Dr Ian H Clark – Geonet Consulting Group
Pit Dewatering Assessment & Bore Completion Report
Mr Grant Bolton, Rockwater Pty Ltd
Geochemistry Report
Mr Ian Swane, Terrenus Pty Ltd
Acid Sulphate Soils Assessment
Melanie Nunn, URS Australia
Surface Water Assessment
Mr Fanie Van der Linde, URS Australia
Ms Michelle O'Shea, URS Australia
Ms Amandine Bou, URS Australia
Flora and Vegetation Report
Dr Libby Mattiske, Mattiske Consulting Pty Ltd
Woodman Consulting 2001
Dieback Assessment
Mr Evan Brown, Glevan Consulting
Vertebrate Fauna Report
Mr Stewart Ford and Dr. Erich Volschenk, *ecologia* Environment
Carnaby's Cockatoo Habitat Assessment
RE Johnstone and T Kirkby
Short Range Endemics
Mr Stewart Ford and Dr. Erich Volschenk, *ecologia* Environment
Stygofauna Surveys
Mr Stefan Eberhard, Subterranean Ecology
Troglofauna – Literature Review
Mr Stefan Eberhard, Subterranean Ecology
Noise Assessment
Mr Paul Keswick, SVT Engineering.
Air Quality Assessment
Ms Christine Killip, Katestone Environmental
Social Impact Assessment
Ms Gaye McKenzie, Principal Social Scientist
Traffic and Transport Assessment
Mr Benham Bordbar, Transcore Pty Ltd
Stygofauna Risk Assessment
Mr Stuart Halse, Bennelongia Pty Ltd
Solute Transport
Ian Brunner, Senior Principal Hydrogeologist, URS
Mr Rob Wallis, Principal Hydrogeologist, URS
Mr Boon Eow, Senior Hydrologist, URS
Mr Wen Yu, Principal Hydrogeologist, URS
Mr Andrew Mussell, Project Hydrologist, URS
Greenhouse Gas Assessment
Mr Venky Narayanaswamy, Principal Engineering and Technical Sustainability, URS
Mr Chacko Thomas, Environmental Engineer, URS
Aboriginal Heritage Survey
Mr Nicholas Green, Anthropos Australis

Contributions to the PER were made by personnel from URS Australia
Ms Sonia Finucane, Senior Principal Environmental Scientist

Ms Jenny Becher, Principal Environmental Scientist
Ms Karen Ariyaratnam, Associate Environmental Scientist
Mr Chris Thomson, Senior Environmental Scientist
Ms Gillian Tomkinson, Project Environmental Scientist
Mr Jared Leigh, Senior Environmental Scientist
Mr Don Burnside, Principal Natural Resource Scientist
Ms Tanya Carpenter, Senior Environmental Scientist
Ms Hannah Fletcher, Project Environmental Scientist
Mr Julian Neurauter, Graduate Environmental Scientist
Ms Kate Philp, Graduate Environmental Scientist

Contributions to the PER were also made by:
Dr Geoff Kew, Kew Wetherby Soil Survey
Mr Doug Blandford, D.C. Blandford and Associates

CWC concludes that on the basis of the above, it is considered that while local biodiversity values will be lost where clearing occurs the Project is unlikely to result in the extinction of any species and therefore should not have a significant adverse impact on regional biodiversity values.

Issue 4.2	*"The mine and the power station are essentially dependent on each other and therefore the total environmental impacts of (both projects) should be considered in the assessment process."* *Raised by the Wildflower Society of Western Australia*
Response	The PER documentation for both projects clearly identified that the two projects were interdependent and integrated. However, the projects are being presented under separate environmental reports as they are owned by separate legal entities and are quite different projects – though related. Where the impacts of the two projects are cumulative the PER documentation has made a cumulative assessment of the combined impacts so that the environmental impact assessment can be made based on the cumulative impacts. The greatest cumulative impacts will be to regional distribution of vegetation communities and to the species *Tetratheca nephelioides* and *Grevillea althoferorum* subsp. *althoferorum*. Cumulative impacts are discussed in Section 6 of the PER (Aviva/URS 2009a) and summarised in the table below (Table 1).

Table 1: Summary of Significant Cumulative Impacts and Management Measures Applicable to the Relevant EPA Environmental Factors.						
Factor	**Element**	**Objectives**	**Cumulative Potential Environmental Impacts**	**Proposed Mitigation and Management Measures**	**Predicted Outcome**	**Section**
Biophysical	Conservation Estate	To protect the environmental values of areas near the project area identified as having significant conservation value.	Clearing of up to 30 ha of vegetation along the southern boundary of the SENR, including the loss of some individuals of DRF and Priority Flora. Potential for indirect impacts due to activities such as mine dewatering. Potential impacts on the SENR and LLNR due to dust impacts on vegetation, mine dewatering and other issues listed in Table 6-2 of the PER.	Implement EMPs and rehabilitation and closure plans. Clearing of infrastructure corridor within the SENR restricted to 20 m wide. Environmental offset proposed.	Localised reduction of biodiversity within that section of the power station infrastructure corridor that traverses the SENR, including the loss of some individuals of DRF and Priority Flora. No significant impact on the LLNR conservation values predicted.	See below
	Landforms and Soil	To maintain the integrity, ecological functions and environmental values of soils and landforms in the project area. To minimise the footprint of disturbance during the life of the Project. To maximise the retention and viability of topsoils for future rehabilitation activities.	Disturbance of a total footprint of 2,183 ha, of which 1,273 ha has already been cleared to previous land uses. This includes some areas of dispersive soils.	Implementation of proposed EMPs including progressive rehabilitation.	Landform and soil issues can be managed through appropriate handling and storage methods.	Section 7.9 of CCP PER, and section 7.6 of CWC PER.
	Acid Mine Drainage	To minimise the risk to the environment resulting from potentially acid forming materials.	No cumulative impact as all AMD issues are associated with the CWC Project.	As per CWC EMPs. Further testwork proposed to assist in management of any residual risks.	No unacceptable environmental outcome predicted.	Section 8.3 of the CWC PER.
	Surface Water	To maintain the quantity and quality of surface water flows	Localised and minor changes to surface water flows due to	As per EMPs.	No unacceptable environmental outcome	Section 7.8 of the CPP PER

Table 1: Summary of Significant Cumulative Impacts and Management Measures Applicable to the Relevant EPA Environmental Factors.						
Factor	**Element**	**Objectives**	**Cumulative Potential Environmental Impacts**	**Proposed Mitigation and Management Measures**	**Predicted Outcome**	**Section**
		so that environmental values, including ecosystem maintenance, are protected.	drainage diversion and other project activities.		predicted.	and Section 7.7 of the CWC PER.
	Groundwater	To maintain the quantity and quality of ground water so that existing and potential environmental values, including ecosystem function, are protected.	Coolimba will use mine water abstracted by the Central West Coal Project. Pumping from the Yarragdee aquifer may be required to provide back-up water.	As per EMPs. Measures include comprehensive water and vegetation monitoring programs.	Reduction in groundwater levels due to mine dewatering and water supply for the CPP.	Section 7.8 of the CWC PER and Section 7.7 of the CPP PER.
	Vegetation and Flora	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	Total remnant vegetation clearing for both projects is 910 ha, most of which will be due to the mine pit (860ha). This will include the loss of some populations of DRF and priority flora. Vegetation may be adversely affected by groundwater drawdown in localised areas.	As per EMPs. Measures including minimising clearing, progressive rehabilitation, studies of vegetation dependence on groundwater and monitoring of vegetation stress from groundwater drawdown, , further studies to locate DRF and Priority species within adjacent Conservation Estate areas as well as weed, fire and dieback management. The proponent commits to taking only 10% *Tetratheca nephelioides* individuals known to occur within the Coolimba Project Area and 9% of *Grevillea althoferorum* subsp. *althoferorum* individuals known to occur as discussed in the Response to Issue 5.3.3. Ministerial Approval will be sought before taking DRF	Loss of some populations of DRF and Priority Flora within the Project Areas, but no loss of species expected or ecosystem productivity at a regional scale expected. The risk of indirect impacts affecting DRF and Priority Flora outside the project footprints is expected to be minimal after mitigation measures are implemented. Environmental offset proposed in relation to clearing of vegetation including some populations of DRF and priority flora.	Section 7.2,7.3 of the CWC PER and CPP PER

Table 1: Summary of Significant Cumulative Impacts and Management Measures Applicable to the Relevant EPA Environmental Factors.						
Factor	**Element**	**Objectives**	**Cumulative Potential Environmental Impacts**	**Proposed Mitigation and Management Measures**	**Predicted Outcome**	**Section**
				species		
	Vertebrate Fauna	To maintain the abundance diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	Localised loss of feeding and breeding areas for species including the Carnaby's Black-Cockatoo and the Rainbow Bee-eater.	As per EMPs. Measures include restricting vegetation clearing, progressive rehabilitation with appropriate species for a food source for Carnaby's Black-Cockatoo.	No unacceptable environmental outcome predicted.	Section 7.5 of the CPP PER and 7.9 of the CWC PER
	Invertebrate and Short Range Endemic (SRE) Fauna	To maintain the abundance, diversity, geographic distribution and productivity of invertebrate fauna at the species and ecosystem levels through the avoidance or management of adverse impacts.	There will be no cumulative impact as all species recorded were found outside of the project areas and no residual effects on local SRE populations are considered likely.	No measures are considered necessary.	No unacceptable environmental outcome predicted.	Sections 7.10.2 of CWC (p222) and Section 7.6 of the CPP PER
	Subterranean Fauna	To maintain the abundance diversity, geographic distribution and productivity of subterranean fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	One stygobite species (Bathynellidae syncarid) is likely to be affected by the CWC Project, but no cumulative impact is predicted.	No measures are considered necessary.	No unacceptable environmental outcome predicted.	Section 4.9 of CPP PER and Section 7.11 of CWC PER
Pollution	Air quality	To ensure that emissions and dust do not adversely affect environmental values or the health , welfare and amenity of people and land users.	Both projects will result in air emissions including dust.	As per EMPS.	Minimal risk of impacting receptors. No unacceptable environmental outcome predicted.	Section 8.1 of the CPP PER and 8.4 of the CWC PER.

Table 1: Summary of Significant Cumulative Impacts and Management Measures Applicable to the Relevant EPA Environmental Factors.						
Factor	**Element**	**Objectives**	**Cumulative Potential Environmental Impacts**	**Proposed Mitigation and Management Measures**	**Predicted Outcome**	**Section**
	Greenhouse Gases	To minimise emissions to levels as low a practicable on an ongoing basis and consider offsets to further reduce cumulative emissions.	4.008Mtpa of CO_2e cumulative impacts.	As per EMPS. Measures include development of a power station that is CCS ready. Other measures include implementing energy efficiency programs.	The Proponents are committed to a phased carbon capture and storage (CCS) Implementation Project. Development of the coal mine has potential to decrease WA's GHG emissions on a per unit energy consumed basis through the adoption of CCS practices at Coolimba.	Section 8.5 of the CWC PER, Section 8.3 of the CPP PER
	Noise	To protect the amenity of sensitive receptors.	A small exceedance at one residence (R6).	As per EMPs, which include attenuation noise measures and monitoring.	Minor exceedances of prescribed noise limits during construction phase and at nearest receptor during the operation phases of the Projects.	Section 8.4 of the CPP PER and section 8.6 of the CWC PER
Social	Visual Amenity	To ensure that aesthetic values are considered and visual impacts minimised.	Both projects will be visible to transient and stationary receptors at various locations adjacent to the Project Areas.	As per EMPs. Measures include directional lighting to limit the impact of night time views and planting of screening vegetation.	No unacceptable environmental outcome predicted	Section 9.3 of the CPP PER and section 9.3 of the CWC PER
	Aboriginal Heritage	To ensure that changes to the biophysical environment do not adversely affect historical	There are no cumulative impacts as no Aboriginal heritage sites have been	Consultation with indigenous land owners and implementation of heritage agreements where	No unacceptable outcome predicted.	Section 9.4 of the CWC PER and CPP PER

Table 1: Summary of Significant Cumulative Impacts and Management Measures Applicable to the Relevant EPA Environmental Factors.						
Factor	**Element**	**Objectives**	**Cumulative Potential Environmental Impacts**	**Proposed Mitigation and Management Measures**	**Predicted Outcome**	**Section**
		and cultural associations and comply with relevant heritage legislation to avoid impacts to Aboriginal heritage sites.	recorded at the CPP. Two potential sites are likely to be disturbed as part of CWC Project development.	appropriate. Section 18 clearances will be sought for any disturbance of heritage sites.		
	European Heritage	To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.	There are no cumulative impacts as no European sites occur within the Project Areas.	No measures are considered necessary.	No unacceptable outcome predicted.	Section 9.5 of the CWC PER and CPP PER
	Public Health and Safety - Road Transportation	To minimise changes to local traffic where possible, and ensure road safety.	Increased traffic due to the Projects, but no significant impact predicted.	Improvement measures to the existing road networks have been made and will be discussed with Main Roads WA and the Shires.	No unacceptable outcome predicted.	Section 9.2 of CWC PER and CPP PER
	Land Use and Community	To maximise social and economic benefits to the local community.	Increased population due to combined construction and operational workforces (600 persons and 100 persons respectively) could result in social impacts and increased pressure on services and businesses. (Benefits including increased employment opportunities, reliable energy supply, business opportunities etc.	Measures are designed to combat cumulative impacts.	Positive legacy due to the introduction of the construction camp. No unacceptable outcomes predicted.	Section 9.1 of CWC PER and CPP PER

Issue 4.3	*Inadequate consideration of the principles of Environmental Protection as set out in Position Statement No.7.* *Raised by the Wildflower Society of Western Australia*
Response	The Wildflower Society has stated that *"… we don't believe the proponent has properly considered the …Precautionary, Intergenerational Equity, Conservation of Biological Diversity and Ecological Integrity Principles."* The Proponent is of the view that these principles have been adequately considered throughout the PER including and specifically in Section 7.1.1 Sustainability Assessment and 7.1.2 Assessment of EPA Principles of Environmental Protection. A discussion of the consideration of the definitions of these principles' (from Position Statement 7 (Table 7-2) (EPA 2004a)) and specific examples of how Coolimba has addressed some matters is included below. A summary of CWC's proposals to address each of these principles is shown below. **The Precautionary Principle** states that where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and (b) an assessment of the risk-weighted consequences of various options. For the Precautionary Principle to be applicable there needs to be two concurrent situations. The first is a threat to the environment and the second is a degree of scientific uncertainty. For example, a threat to the environment will consist of the clearing of 861 ha of vegetation to be cleared, impacting on the regional distribution of communities. In order to reduce the scientific uncertainty, vegetation surveys were carried out in the Aviva lease area in 2005 and 2006 and in Lake Logue Nature Reserve (LLNR) in 2008. In all, approximately 188 sites were sampled. Given the diverse nature of kwongan heath, these studies do not completely dismiss scientific uncertainty; however they did allow CWC to understand the impact that the project would have on the distribution of vegetation communities. In order to prevent environmental degradation, CWC will implement the management and monitoring measures outlined in the EMP and has committed to continuous and progressive rehabilitation and to providing a 861 ha offset and to better define the impact of clearing at a regional level. Another example of how the Precautionary Principle has been applied to the project relates to sygofauna. One stygobite was identified in field surveys, an undescribed Bathynellidae syncarid. This animal was found in a bore located within the proposed mining area and so may be affected by mine dewatering and will be affected by mining. Although not recorded outside of the Project Area, a risk assessment conducted by a reputable subterranean fauna specialist has indicated that this species is highly likely to occur outside of the Project Area (see PER Appendix T (Aviva/URS 2009a)).

The principle of Intergenerational Equity requires that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. This definition implies that the current generation have stewardship of the environment. In terms of the CWC project, application of this principle would suggest that the proponent is responsible, as an example, to ensure that the current amount of vegetation is not reduced at the end of the project. The proponent has committed to assuming stewardship by (as an example) providing an offset of 861 ha of vegetation and progressively rehabilitated disturbed areas over the life of the project.

The principle for biological diversity and ecological integrity requires that conservation be a fundamental consideration. EPA (2004a) goes on to further define the levels and underlying principles of biological diversity and ecological integrity, under the assumption that the protection of biological diversity will protect ecological integrity.

The levels of biological diversity as defined by the EPA (2004a) are genetic, species and ecosystem diversity. These are all threatened locally by the clearing proposed for the CWC Project. It is proposed to protect these values by providing a vegetation offset, progressively rehabilitating disturbed areas, avoiding clearing where possible and by conducting studies to ensure that there is sufficient representation of species and communities in surrounding nature reserves.

5. RESPONSE TO BIOPHYSICAL ISSUES RAISED IN SUBMISSIONS

5.1. Impact of Dewatering

Issue 5.1.1	*The PER has identified that dewatering may affect other water users. These effects must be considered in both the EPA and the DoW assessment processes.* *Raised by the Department of Water*
Response	The main aquifers that will be dewatered during mining are the area of the Cattamarra Coal Measures (CCM) bounded by the Warradarge and Peron Faults and the Superficial aquifer lying over the top of this area of the CCM. There is no defined confining layer between these aquifers, and the phreatic surface and potentiometric surface have very similar elevations; therefore, the aquifers are assumed to be in direct hydraulic connection and the superficial aquifer has been incorporated into the upper portion of the CCM cells in the hydrology model. The users of the CCM and superficial aquifers that are predicted (by the modeling) to be impacted are the local agriculturalists who use the aquifers for stock and domestic needs. Figure 7-1 of the PER shows the depth to groundwater for the project area and Figures 7-3 to 7-5 show the predicted groundwater drawdowns after 5, 10 and 30 years. Based on these predicted drawdowns a list of the known local agriculturalists who will potentially be impacted by the dewatering has been determined. Each of these local agriculturalists have been consulted and the Project will enter into suitable contractual arrangements with the local agriculturalists to supply any loss of water from the dewatering program. In addition, the drawdown after 30 years of dewatering may extend to other locations where there are a number of licensed water users. If the modeling provided in the PER proves to be accurate the effect on these users is not expected to be significant. If a license to take water is granted the Project will implement the following to manage impacts to other users: • A monitoring bore network within the Superficial, Cattamarra Coal Measures, Eneabba and Yarragadee aquifers to observe changes in groundwater levels will need to be established. • A monitoring program for the dewatering bore network. • Determination (with input from the DoW) of relevant triggers based on groundwater level changes that would require CWC to amend its dewatering practices or remedy impacts. • Conduct additional modeling (with input from DoW) if impacts beyond those determined by the current model presented in the PER are detected. These additional commitments have been included in the revised schedule of Environmental Commitments (Commitment 8) in Section 2.3.

Issue 5.1.2	*"The PER has also identified a number of potential GDEs that may be impacted by dewatering at the mine. These include LLNR, SENR, Rocky Spring and the Rocky Springs Threatened Ecological Community. Further investigations will be required to increase understanding of the level of groundwater dependency and the likely impacts from dewatering."* *Raised by the Department of Water* *"There is the potential for a number of GDEs within or in close proximity to the disturbance (drawdown) footprint, including Lake Logue, Lake Indoon, Rocky Springs TEC and Erindoon Creek, to be affected by groundwater abstraction associated with the proposal."* *Raised by the Department of Environment and Conservation* *"Experience with an ironstone TEC in the State's south-west has shown that mine dewatering was implicated in the significant vegetation collapse of the TEC. An understanding of the hydraulic connectivity between aquifers that support GDEs is essential if there is a significant risk that artificial maintenance of the groundwater levels may be required."* *Raised by the Department of Environment and Conservation*
Response	The PER provides a description of the ecological water requirements in Section 7.4 Groundwater Dependant Ecosystems and uses the input from the Dewatering Assessment (Appendix E) to determine the potential impacts on GDEs. CWC believes that it has made a full assessment of the risk to the potential GDEs in the Project area. The DEC has recommended that "*A sensitivity analysis be undertaken for identified GDEs and the drawdown potential at those locations be determined."* CWC advises that a sensitivity analysis has been undertaken and is discussed in Section 7.4 of the PER (Aviva/URS 2009a) which identifies the GDEs that could potentially exist in this area. Each of the potential GDEs is then discussed in some detail including a discussion of the potential impacts from the predicted groundwater drawdown. A summary of the discussion in Section 7.4 of the CWC PER is included below. Watertable drawdown in the Cattamarra aquifer, which could affect water levels in Lake Indoon, is expected to be negligible in the immediate area of Lake Indoon. Consequently the Lake Indoon GDE is not expected to be adversely affected by groundwater drawdown induced by mine de-watering. Lake Logue is the surface expression of a perched water-table reliant on surface water flows that will not be impacted by the CWC mine. Lake Logue is not in close hydraulic connection with the underlying aquifers. For these reasons the Lake Logue GDE will not be affected by groundwater level changes arising from mine de-watering. The water table(s) at the Rocky Springs GDE/TEC site have been shown to be in limited hydraulic connection with the underlying aquifers that could be affected by

drawdown induced by mine de-watering. Consequently the Rocky Springs GDE/TEC is not expected to be affected by mine de-watering.

The groundwater supporting the Erindoon Creek GDE, immediately west of the project area is believed to be in limited hydraulic connection to the underlying aquifers that could be affected by drawdown induced by mine dewatering. Consequently the Erindoon Creek GDE is not expected to be affected by mine de-watering

Flora surveys in the south east of the LLNR and in the SENR near Rocky Springs indicate that vegetation in and near the project area, including vegetation along Erindoon and Bindoon Creeks and other drainage lines is predominantly shallow rooted, and therefore is unlikely to be dependent on groundwater associated with the underlying Cattamarra and 'superficial' aquifers.

Soil surveys indicate that vegetation in the project area is heavily, if not wholly dependent on rainfall stored in soil strata above the water tables associated with the underlying aquifers. This water is retained in pores above the water tables (vadose water), and as discrete 'perched' aquifers which form above low permeability horizons which are commonplace locally and regionally in the Perth sandplain environment. Consequently mine dewatering is not expected to significantly affect the amount of water available to vegetation, including vegetation associated with GDE's. Individual plant species with greater dependency on groundwater that may be impacted will be monitored and managed.

Rainfall and surface water flows are considered to be the most important sources of ground water re-charge as far as this near surface groundwater is concerned.

The groundwater model will be validated by expanding the groundwater monitoring network during mine development and operations phases, and further studies will be undertaken during operations to confirm the relationship between native vegetation and the water on which it relies.

Commitment 5 in the PER proposes further analysis of the potential GDEs as part of developing the Project including the development of groundwater monitoring and groundwater drawdown impact monitoring (refer to Section 2.3). Amendments to Commitment 5 have been made (refer above) based on comments made in these submissions.

****

CWC acknowledges that special care needs to be given to understanding and monitoring TECs.

CWC has assessed the existing environment of the area known as Rocky Spring which includes a known TEC, in the vicinity of the Project. CWC has assessed that the dewatering is *"not expected to have any impact on the Rocky Spring"* area.

The following has been extracted from the PER showing the assessment of the TEC and the predicted impacts from the proposed dewatering. It should be noted that recognised experts from Rockwater (30 years experience in hydrology in the region), Mattiske Consulting Pty Ltd (20+ years of vegetation and flora experience in the region) and D.C. Blandford and Associates (30+ years of experience in assessing the soil profiles and soil / vegetation interaction in the region), supervised by URS Australia Pty Ltd have all worked together in the analysis presented in the PER on the matter of the TEC and the potential impacts on the

TEC.

Extract from PER Section 7.4.2 page 7-17

"Rocky Spring represents discharge from the Yarragadee aquifer through the overlying surficial sediments (DoE 2005). The spring sits inside the SENR where the existing groundwater levels in the CCM are in the order of 10 m below ground. The CCM and Yarragadee aquifers in this location are separated by the Warradarge fault which is represented in the groundwater model as a partial flow barrier, allowing limited groundwater movement between the two aquifer systems. Water levels are generally 10 to 15 m higher in the Yarragadee aquifer compared with the CCM aquifer west of the fault. Groundwater drawdown from dewatering will not impact on water levels in the Yarragadee and is not expected to have any impact on Rocky Spring."

"A Threatened Ecological Community (TEC) occurs in the vicinity of the Rocky Spring GDE within the SENR and is known as Community 72 Ferricrete Floristic Community or the Rocky Springs Ferricrete Community. The TEC is located outside the project area but the underlying groundwater could be drawn down up to 30 m. The pre-mining water table is approximately 10 m below surface and it is not expected that the vegetation will have access to this water. Monitoring by Rockwater (1997) and Woodman (2007) for Iluka on the impacts of groundwater drawdown at the Eneabba West mining operation has demonstrated that no correlation exists between groundwater drawdown in this area and the health of the neighbouring vegetation. An analysis of vegetation dependency on groundwater in the project area by D.C. Blandford and Associates (2008) suggests that the deeper rooted vegetation occurs on laterite or ferricrete soils which store meteoric water in the soil and or perched watertables which are accessible by vegetation. On the basis of the high proportion of the root systems in the upper 30-40 cm of the surface and the absence of deep tap rooted species it appears that the vast majority of the plant species are reliant on soil moisture from rainfall events (Mattiske, 2009)."

CWC has assessed that the potential for the dewatering activities to have a negative impact on the Rocky Springs TEC is low. Despite the conclusion of this assessment CWC has committed (refer to Commitment 5 in Section 2.3) to further work to update its understanding of the TEC to assist in developing appropriate management plans if any negative impacts occur in the future. Dewatering activities are unlikely to significantly impact the area of the Rocky Springs TEC until 5 years after commencement of the dewatering (refer Figure 7.3 of the CWC PER) which is possible as late as 2016, thereby giving CWC some time to investigate this TEC further.

The vegetation monitoring component will include a combination of transects and permanent plots located in the representative areas (as highlighted above). The earlier studies on the flora and vegetation will be extended to enable a better understanding of the species and communities near the defined TEC and in the local context. Measurements on vegetation will include standard measurements on numbers and cover of plants as well as overall condition of the plants. This data will then be compared statistically with other information as provided to date by DEC on the TEC.

****

The Rockwater (1997) report is a referenced document and can be made available on request.

Issue 5.1.3	*The proposed dewatering is likely to have a detrimental impact on biodiversity.* *The hydrology modeling is only that, modeling, and past experience has shown this to be wanting.* Raised by the Wildflower Society of Western Australia
Response	It is unlikely that dewatering will have an unacceptable detrimental impact on vegetation and or biodiversity that will not be directly impacted by mining. Many of the plant communities occur in areas where the groundwater table is more than 20m deep. The only lifeform that may be dependent on groundwater are trees which, for the most part, occur in areas where groundwater is below 20m, and where this is not the case display facultative dependence on groundwater. Therefore it is unlikely that these species are dependent on groundwater. Section 7.4.2 of the CWC PER indicates that perched water is critical as it forms the major water source for shallow rooted species and is also a water source for non-shallow rooted species that do not tap into the capillary fringe above a true groundwater aquifer. This section also comments that vegetation of the LLNR is dominated by heath and scrub communities of which the majority of plants have shallow root systems and are dependant on soil moisture from rainfall events rather than groundwater (Mattiske 2009). Lake Indoon is described in this section of the PER as expected to be connected to groundwater though the groundwater drawdown modeling suggests there will be no impact at Lake Indoon from dewatering (refer PER Section 7.8.2 and Figure 7-5) as the lake is located west of the Peron Fault and is at least 4 km distant from the planned mine pit and associated dewatering. Further, analysis of the vegetation at Lake Indoon has concluded that the Eucalyptus *camaldulensis* var. *obtusa* woodlands around Lake Indoon have already been subjected to various periods of drought and despite some stress, the trees have survived these periods (Mattiske 2009). This suggests that there is a degree of resilience to water stress in the vegetation of this area (Mattiske 2009), most of the vegetation is facultatively dependent on groundwater. The proposed dewatering may have a localised impact (refer to the Response to Issue 5.1.2 above for potential impacts) on some plant communities and some individual flora species. The potential impacts will not lead to a significant adverse impact on regional biodiversity. ********** CWC acknowledges that the dewatering modeling only delivers predicted results and actual results may vary from the predicted results. CWC advises however that the model has benefitted from many years of experience in the region of the project by Rockwater who have worked on the Mineral Sands mines in the area for some time. The model has been validated using the experience and groundwater data from these mines. The following is an extract from the Rockwater Dewatering Assessment. *"The model was calibrated in steady-state mode to groundwater levels recorded in the DoW WIN database, and those measured in bores installed for this project and for the Eneabba West and East mines. They were measured at different times and so are subject to short and long-term variations in climate and land-use….* *"… the model was verified by closely simulating the impacts of extraction from the Eneabba West borefield.*

"Past extraction of water from the Eneabba West borefield, and the associated water level monitoring data have been used to assess whether predictions made using the groundwater model are realistic.
"… pumping from the Eneabba West borefield has been incorporated into the model to allow modeling results to be validated against monitoring data.
"Overall, the modeled water level drawdown is similar to the measured drawdown although the latter are very irregular." Extract from CWC PER Appendix E page 20,21

CWC will monitor the dewatering activity and will use the monitoring data to confirm the predictions of the model. Where necessary the model will be revised to encompass the new data and revisions will be made to the management plans based on any revision to the modeled outcomes (refer to Commitment 8 in section 2.3).

A draft water management plan was developed as part of the PER process (refer Appendix C of the PER) which included a description of the monitoring program to be developed (refer Section 3.7 of Appendix C).

CWC proposes that the monitoring program (prepared in consultation with the DoW) will be implemented to monitor the dewatering program and the impacts of the dewatering program on surrounding aquifers. If the monitoring program identifies outcomes that are not in line with the predicted outcomes, additional modeling will be performed to update the predicted outcomes and management practices altered accordingly.

Issue 5.1.4	*"The infrastructure and pit will require management of surface water which will change the natural regime. … The disruption to the surface flow created by the pit may have an adverse effect on the flow in Erindoon Creek and surface water levels in Lake Indoon."* *Raised by the Department of Water*
Response	Studies of surface water flow prepared as part of the PER show that the impact of the downstream surface water hydrology is predicted to be minimal since a major portion of the surface runoff from the upstream catchment will be diverted and continue to flow to the lake system. The total area lost amounts to less than 3% of the catchments affected, so the potential run-off reduction will not be greater than 3%. A surface water monitoring program will be developed and implemented to monitor impacts from the proposal.
Issue 5.1.5	*"The comment that perched water would continue to provide moisture to riparian vegetation, water to Lake Indoon and potentially reduce impacts of dewatering (Section 7, pages 7-16 to 7-17) is not considered to be correct."* *Raised by the Department of Water*
Response	Section 7.4.2 of the CWC PER indicates that perched water is critical as it forms the major water source for shallow rooted species and is also a water source for non-shallow rooted species that do not tap into the capillary fringe above a true groundwater aquifer.

This section also comments that vegetation of the LLNR is dominated by heath and scrub communities of which the majority of plants have shallow root systems and are dependant on soil moisture from rainfall events rather than groundwater (Mattiske 2009).

Lake Indoon is described in this section of the PER as expected to be connected to groundwater though the groundwater drawdown modeling suggests there will be no impact at Lake Indoon from dewatering (refer PER Section 7.8.2 and Figure 7-5) as the lake is located west of the Peron Fault and is at least 4 km distant from the planned mine pit and associated dewatering. Further, analysis of the vegetation at Lake Indoon has concluded that the Eucalyptus *camaldulensis* var. *obtusa* woodlands around Lake Indoon have already been subjected to various periods of drought and despite some stress, the trees have survived these periods (Mattiske 2009). This suggests that there is a degree of resilience to water stress in the vegetation of this area (Mattiske 2009).

Issue 5.1.6	*"Crucial hydraulic characteristics of the groundwater aquifers have not been investigated to assess the level of connectivity of the stated groundwater abstraction footprint, to other hydraulic features such as creeks, springs and fault boundaries."* *"Erindoon Creek has been identified as having a hydraulic connection with the underlying aquifers potentially affected by abstraction, therefore affecting both the creek systems and the ecological water requirements of systems downstream."* *"Further to the impacts associated with dewatering, there is the potential for changes to surface water quantity and quality, affecting natural drainage systems and downstream ecosystems (surface lakes and groundwater aquifers) as mining works will intercept natural drainage systems."* *"If, due to the amount of dewatering, the change in flows of Erindoon and Bindoon Creeks is predicted to be extensive, this will most likely cause a negative impact on Lakes Logue and Indoon."* *Raised by the Department of Environment and Conservation*
Response	All of the hydraulic characteristics of the groundwater aquifers have been assessed. This includes: • Warradarge Fault to the East and the Yarragadee aquifer East of the fault. • Peron Fault to the West and the Eneabba Formation to the West of the fault. • Superficial Aquifer overlying the Cattammarrra Coal Measures aquifer. • Surface Hydraulic features such as creeks, springs and lakes in the project area. <u>Faults</u> The Dewatering Assessment (CWC PER Appendix E) clearly identifies the fault boundaries that have been applied to the abstraction footprint and assesses the level of connectivity with those fault boundaries with reference to the known geological formation, historical dewatering experience and test work completed as part of the dewatering assessment. In summary the area to be dewatered (abstraction footprint) is bounded to the east by the Warradarge fault and to the West by the Peron Fault.

The Warradarge fault has been assessed and is shown in the hydrological model as a partial flow barrier allowing limited groundwater movement between the two aquifer systems.

The Peron Fault has been modeled as an impermeable barrier due to the following reasons:

- distance of 4km from the proposed dewatering bore field,
- the CCM strata to the east of the fault dip to the east,
- the CCM strata to the east of the fault have a low vertical permeability due to interbeds of shale.

Further analysis of the level of connectivity with the faults will be conducted in the future as part of the monitoring program to be developed and implemented and the model will be amended accordingly.

Superficial aquifer and the surface hydraulic features

The potential impacts to the superficial aquifer and the surface hydraulic features such as creeks and springs and the downstream ecosystems have been assessed in the following way.

Firstly the dewatering assessment and related predicted groundwater drawdowns assumed that there was a total hydraulic connection between the deeper groundwater aquifers and the near surface superficial aquifer such that the entire superficial aquifer was assumed to be dewatered along with the underlying groundwater aquifers.

This allowed for a worst case analysis of the drawdown impact from dewatering on all users of water including ecological users in the superficial layers.

Secondly, once the extent of the predicted drawdown was determined on specific environmental areas, such as vegetation units, drainage lines and lakes etc. a further analysis of the local hydrological environment was conducted, relevant to that specific environmental area or factor, to determine the likely environmental impacts on a specific basis.

Section 7.4 of the PER deals with the specific assessment of the relevant environmental areas and concludes that in all cases there is a low risk that environmental impact from the dewatering activity cannot be adequately managed.

"Lake Indoon is listed as a GDE (DoE 2005) as is Bindoon Creek and Erindoon Creek. Lake Indoon is in a shallow watertable area (less than 10 m to watertable). However, dewatering is not predicted to have any drawdown at Lake Indoon (as it is on the west side of the Peron Fault). Lake Indoon is fed by Bindoon Creek and Erindoon Creek which traverse a shallow watertable area in their lower reaches. The model suggests that there could be some impact on these creeks if they are gaining creeks (i.e. draw from the watertable in these locations). This impact could extend to Lake Indoon if surface water flows through the creeks is reduced due to the groundwater drawdown. Work done by Blandford (2008) suggests that the only time that Erindoon Creek takes moisture from the underlying aquifer is when the surrounding soils are saturated which would indicate that there has been recent heavy rainfall and the creek would be flowing from these events. Further detail is provided in Section 7.4. Detailed work has not been completed on Bindoon Creek however it is expected to function similarly to Erindoon Creek.
There is minimal expected impact on Bindoon and Erindoon Creeks from groundwater drawdown however CWC will conduct further work to confirm this

(refer to Commitment 3)." Extract from PER page 7-36.

In response to specific matters raised by the DEC we offer the following comments:

- The changes to the surface flows of Erindoon and Bindoon Creeks are not predicted to be extensive (less than 3% of the catchment is affected) therefore the potential for impact to downstream lakes is low.
- Lake Logue is not part of the Erindoon and Bindoon Creeks waterway. Lake Logue is fed by Eneabba Creek from the North.
- The dewatering and related environmental impact assessment presents adequate information to determine the range of possible impacts from the dewatering and predicts the most likely impact.
- Further analysis will be conducted as part of dewatering operations and an assessment of the accuracy of the modeled results and impacts will be made. Where required the model will be updated and a new impact assessment completed including updates to the management plans to accommodate changed outcomes.
- The assessment made and conclusions reached have had the benefit of many years of operational experience in the immediate area with previous mining operations.

As part of the project development CWC has made commitment number 4 in the PER as shown in Section 2.3 above.

Further to this previous commitment by CWC, if the work of Commitment 4 shows that Erindoon and or Bindoon Creeks are groundwater dependant and that there will be a loss of biological value from the dewatering activities impacting on these creeks then CWC will investigate the biological values for both the Erindoon and Bindoon Creeks and the downstream Lake Indoon. This investigation will cover appropriate management processes for the ecological water requirements of these features based on water quality and quantity. Refer Section 2.3 above.

Issue 5.1.7	*"The level of connectivity of the stated groundwater abstraction footprint, to fault boundaries has not been assessed."* *Raised by the Department of Environment and Conservation*
Response	CWC does not agree that the level of connectivity of the abstraction footprint to the fault boundaries has not been assessed. The Dewatering Assessment (PER Appendix E) clearly identifies the fault boundaries that have been applied to the abstraction footprint and assesses the level of connectivity with those fault boundaries with reference to the known geological formation, historical dewatering experience and test work completed as part of the dewatering assessment. In summary the area to be dewatered (abstraction footprint) is bounded to the east by the Warradarge Fault and to the West by the Peron Fault. The Warradarge Fault has been assessed and is shown in the hydrological model as a partial flow barrier allowing limited groundwater movement between the two aquifer systems. The Peron Fault has been modeled as an impermeable barrier due to the following reasons:

- distance of 4km from the proposed dewatering bore field,
- the CCM strata to the east of the fault dip to the east,
- the CCM strata to the east of the fault have a low vertical permeability due to interbeds of shale.

Further analysis of the level of connectivity with the faults will be conducted in the future as part of the monitoring program to be implemented by CWC and the model will be amended accordingly including updates to the management plans to accommodate changed outcomes.

Issue 5.1.8	*"… contingency measures will be needed to ensure that water management at the mine reflects the principles of efficiency and conservation."* *Raised by the Department of Water*
Response	CWC will implement management plans that reflect principles of efficiency and conservation.
Issue 5.1.9	*"It is proposed that water in excess of 9 GL/a may be discharged into natural drainage systems. The impact of this has not been addressed."* *Raised by the Department of Environment and Conservation*
Response	CWC does not propose to discharge dewatered water to the natural drainage systems. Section 2.2.1 discusses various options for disposal of dewatered water in excess of the mine usage and proposes that all mine dewatering water that is not used around the mine will be sent to the mine dewater dam for use in the Coolimba Power Station. The CWC proposal does not include disposal of mine dewatering water to the environment. The proposal does include the disposal of diverted rainfall to the environment but only after any sedimentation or other pollution that is part of the rain water is appropriately treated in sedimentation ponds or other facilities. The Coolimba Power Station also does not include a proposal to dispose of mine dewater water to the environment. All mine water will be evaporated through the cooling function of the power station.
Issue 5.1.10	*The construction of the dewatered effluent storage dam within the Cattamarra Coal Measures aquifer will be appropriate. However, the final location of the dam and issues of evaporation and infiltration will need to be considered and discussed.* *Raised by the Department of Water*
Response	CWC will discuss the final location and the issues of evaporation and infiltration with the DoW prior to finalizing project planning.

5.2. Management of groundwater water quality

Issue 5.2.1	*"It is important for the proponent that water quality is maintained in the pit as it is the main water source for the power station. The co-disposal of ash and saline residues may affect the quality of the dewatered effluent in the long term."* *Raised by the Department of Water*
Response	CWC agrees with the assessment that water quality is important. CWC advises that the issue of the water quality is one that is more important to the Coolimba power station than CWC. Coolimba will take the water and process it to a quality suitable for use in the various processes around the power station. The modeling work completed to date suggests that the altered groundwater quality resulting from the leachate from the rehydration of the co-disposal of ash and saline residue will lag somewhat behind the area of active dewatering and therefore should not impact significantly the quality of the mine dewater. Various management options exist to vary the potential for leachate from the co-disposal of ash and saline residue in the backfill operations and suitable practices will be employed to minimize the potential for environmental harm.
Issue 5.2.2	*The final changes to water level, salinity and other solute concentrations may extend into the Lake Logue Nature Reserve.* *Raised by the Department of Water*
Response	With regard to the impact on the LLNR from potential changes in the groundwater levels. *"The Lake Indoon Reserve (LIR) and Lake Logue Nature Reserve (LLNR) are situated in areas where the depth to regional watertable ranges from 5 m to more than 20 m. Both of these areas have extensive coverage of native vegetation other than the areas of the lakes.* *"Lake Logue itself is not considered a GDE (DoE 2005) as it perched approximately 10 to 15 m above the water table. Thus, the lake will not be directly affected by the proposed mine dewatering or other impacts to groundwater.* *"The vegetation in the south east corner of the LLNR is the area most likely to be affected by drawdown given its proximity to the mining operation albeit at the end of the mine life. The drawdown in this area could be as much as 30 m for an area of approximately 35 ha in the south east corner of the LLNR based on the predicted drawdown in yr 30 and between 30 m and 5 m over much larger portions of the LLNR.* *"The vegetation of the reserve is dominated by heath and scrub communities of which the majority of plants have shallow root systems and are dependant on soil moisture from rainfall events rather than groundwater (Mattiske 2009). Therefore, it is expected that the drawdown will have minimal impact on the vegetation present in the LLNR. This conclusion is supported by monitoring of vegetation transects in the LLNR for Iluka Resources (Woodman 2007) which investigated the impact of drawdown from the Iluka Eneabba West mine borefield on vegetation in the LLNR*

and SENR. The report concluded that "there has been no significant positive correlation between plant density or percent foliage cover and groundwater levels, over 1997 to 2006." It suggests that rainfall is likely to have a stronger influence on the health of vegetation rather than fluctuating groundwater levels.

"Lake Indoon is expected to be connected to groundwater however the groundwater drawdown modelling suggests there will be no impact at Lake Indoon from dewatering (refer Section 7.8.2 and Figure 7-5) as the lake is located west of the Peron Fault and is at least 4 km distant from the planned mine pit and associated dewatering. The CCM strata east of the fault dip to the east, and have a low vertical permeability due to interbeds of shale. This will inhibit east to west groundwater movement, and thus, even if the fault is permeable, there would be little groundwater flow towards the mine pit from west of the fault. Analysis of the vegetation at Lake Indoon has concluded that the Eucalyptus camaldulensis var. obtusa woodlands around Lake Indoon have already been subjected to various periods of drought and despite some stress, the trees have survived these periods (Mattiske 2009). This suggests that there is a degree of resilience to water stress in the vegetation of this area (Mattiske 2009)." Extract from the PER page 7-16

With regard to the impact on the LLNR from potential changes in the quality of the water.

"The solute modelling findings include:

- *Solute plumes remain primarily within the Cattamarra Coal Measures and remained very close to the backfilled mine void.*
- *Substantial solute dilution occurred upon entry to the watertable.*
- *Groundwater levels locally will recover after mine closure to within about 4 m of pre-mining levels.*
- *A lake will form in the final void and will capture salt and metals in the residual plume and salt and metals in the local groundwater flow.*
- *The concentration of salts and metals in the final void lake will increase as a result of evaporation reaching hyper-saline (>100,000ppm TDS) levels after 500 years beyond mine closure.*

"Salt concentrations in the ash leachate are expected to be low. The pH of leachate is expected to be in a range 7 to 8. Metals concentrations in the ash leachate are below detection limits except for Al, As, B, Cr, Cu, Mo, and Zn. (Terranus, 2008).

"After ash co-disposal, salt and metal concentrations in local groundwater are expected to remain within ANZECC (2000a, 2000b) guideline values for marine quality water, but may exceed the 90% and 95% trigger values for freshwater aquatic ecosystem protection and also livestock drinking water guidelines. The metals that may exceed these guidelines are Al, As, B, Cr, Mo, and Zn. (URS, 2008).

"Given that the groundwater affected by the small increases in some salt and metal concentrations is unlikely to be exposed to downstream ecosystems, or abstracted by potential users, and that dilution effects are likely to make the increases in salt and metal concentrations insignificant, it is expected that co-disposal of ash in mine backfill will not adversely impact groundwater quality." Extract from PER

page 8-4.

CWC agrees that the impacts from the dewatering and subsequent backfill operation of the proposal may extend into the LLNR. The findings of the studies however do not suggest that there will be any significant environmental impact from these impacts.

5.3. Vegetation and Flora

Issue 5.3.1	*Biodiversity is best preserved insitu.* *Raised by the Wildflower Society of Western Australia*
Response	The biodiversity values and the impacts have been defined as part of the PER (Section 7 in particular 7.13) and although there will be some loss of the extent of the respective Tathra and Eridoon systems. These vegetation systems are held in the conservation estate and extend well beyond the project impact area. At a finer scale of definition some of the communities as defined by Mattiske Consulting Pty Ltd (Appendix K) will be cleared. Further studies proposed in spring months of 2009 will clarify the extent of these communities as defined in the wider local area (including SENR and LLNR). The PER summarizes both the direct and indirect impacts of the project and mechanisms to minimize the impacts through a range of management options. Currently the proponent is reviewing offset options and rehabilitation techniques that will protect many of the local biodiversity values on sites that would not have otherwise been managed for that purpose (refer to Commitments 1,2,4,5,6 & 7 in Section 2.3).
Issue 5.3.2	*It is inappropriate to state that the subject area is unlikely to contain a Threatened Ecological Community (TEC), as this can only be determined through floristic plot survey (which has not been undertaken by the proponent) and subsequent verification by DEC.* *Raised by the Department of Environment and Conservation – Terrestrial Ecosystem Branch*
Response	Two of the locations of the TEC as defined by DEC have been reviewed by site inspections and it is intended to undertake further work on site in the spring months of 2009. There is some difficulty in delineating the exact location and boundary of the TEC (as discussed previously with DEC officers on site). This difficulty largely relates to the delineation of the TEC on the base of relatively limited data sets. The soil and underlying geological features that determine the apparent occurrence of the TEC also appear to have flaws in their determination (see *D.C. Blandford and Associates [2008])*. Hence, although comparisons have been made with the information published by Hamilton – Brown *et al. (*2004) there are still major gaps in the adequacy of the understanding and delineation of this community. If one reviews the floristic composition, there are difficulties as explained earlier by Mattiske. Further, the DEC location near Rocky Spring Road is not clear as the ferricrete exposure occurs east of the GPS location as provided by DEC. DEC needs to clarify the criteria that defines this community more clearly. In order to help delineate this community more clearly, monitoring sites (including

transects) will be established on the TEC community on Rocky Spring Road. Measurements on vegetation will include standard measurements on numbers and cover of plants as well as overall condition of the plants. This will entail coverage of the variety of communities near the DEC designated site and will provide more detailed clarity on the issues associated with this TEC. This data will then be compared statistically with other information as provided to date by DEC on the TEC. As well more regional mapping is proposed which will enable the TEC and associated communities to be placed into greater context.

Issue 5.3.3

The Declared Rare Flora (DRF) Grevillea althoferorum subsp. althoferorum is known from within the project footprint, however the PER does not identify this or address impacts on this species.

DRF is not adequately addressed in the PER and there is a significant risk that adverse impacts from this proposal have not been presented.

Raised by the Department of Environment and Conservation

Response

Description of Grevillea Althoferorum subsp althoferorum

Currently *Grevillea althoferorum* subsp. *althoferorum* is declared as Rare Flora under the Western Australian Wildlife Conservation Act 1950 in November 1998 *it was ranked as Critically Endangered*. Since this time when less than 300 plants were known (Stack and English 2003) significant numbers of plants (>2500 plants – Woodman 2009) have been located near Eneabba and as a result the security of this species has improved. However, some of the plants are potentially under threat from clearing for mining and also from its vulnerability to the dieback disease resulting from *Phytophthora* species. Therefore although the relative numbers have increased it is recognized that this taxon is still threatened by a range of processes.

Addressing *Grevillea althoferorum* subsp. *althoferorum* in the PER

During the preparation of the PER, there were five known locations of *Grevillea althoferorum* subsp. *althoferorum* in proximity to the Project including three east of the eastern edge of the proposed pit and two along Erindoon Rd (currently contained within the 12 m road reserve (Stack and English 2003). All of these locations will not be directly affected by the proposal. Indirect impacts on these locations (*e.g.* groundwater drawdown, *Phytophthora* Dieback, etc) have been addressed in the PER.

Work done after the PER

After the preparation of the PER additional surveys identified 2,439 individuals of this species from 861 locations within the CWC footprint and within the SENR. The following table shows the known extent of this species at this time.

	Number of locations	No of individual plants
Historical populations in Eneabba area (per Woodman, 2009)	2	96
February 2009 survey	405	1,366
July 2009 survey	456	1,073
Total from Eneabba area	863	2,535

Source: Woodman, 2009

A map showing the locations of the individual plants in relation to the closest portions of the mine footprint is shown in Figure 2 included in the Figures at the end of this Response to Submissions.

Figure 2 shows the location of the individual plants and groups them dependant on the location relative to the project footprint. This grouping can be summarised as follows. Figure 2 only shows the details of the individuals recorded in the Woodman surveys in 2009.

	Number of locations	No of individual plants	% of Total
Mine Pit	46	215	9%
Waste Dump	38	174	7%
Southern Extension	63	215	9%
SENR	691	1,765	73%
Other	23	70	3%
Total	861	2439	100%

If the project were to proceed as outlined in the PER it would result in the taking of 604 individual plants and the reduction of the known number of plants by approximately 25%.

The following is a discussion of the potential impacts for each area.

Mine Pit – Due to the nature of the mineral resource and the planned mining methods to extract the mineral all of the currently known plants in this group will be removed. Any other plants found in this area in the future will also be removed.

Waste Dump – The location of the waste dump has been moved to minimise the impact on this species. The Waste Dump will now be placed underneath the evaporation ponds required as part of the Coolimba Power Station Project. This is on cleared agricultural land with little to no environmental impact. Figure 3 reflects this change.

Southern Extension – To minimise the impact on this species the southern extension has been removed from the project area. Figure 3 reflects this change.

Border with South Eneabba Nature Reserve – It is noted that there is also a risk of significant indirect impacts on plants adjacent to the eastern extent of the mine footprint and dewatering infrastructure corridor and direct impacts to a limited number of plants within the dewatering infrastructure corridor. CWC commits that none of these currently known plants will be directly disturbed either due to their proximity with the mine pit boundary or their location within the dewatering infrastructure corridor. The required project components that go into the dewatering infrastructure corridor (dewatering bores, pipesand maintenance tracks, etc) are sufficiently flexible to allow individual plants to be protected.

Specific issues related to *Grevillea althoferorum* subsp. *althoferorum* (DRF)

Recent survey successes – Recent surveys have added significantly to the known population of this species. During the surveys undertaken by Woodman (2009) plants of this species were found in a range of different sites. In view of the range of site preferences of this taxon in the CWC and adjacent areas, it is potentially

feasible that the number of plants recorded to date is likely to increase with further searching. The latter was clearly evident from the work undertaken by Woodman Environmental Consulting in 2009 (as summarized above). As indicated in discussions with DEC further searching is being proposed by CWC on this species to locate more plants if possible away from proposed clearing activities.

Susceptibility to *Phytophthora* - *Grevillea althoferorum* subsp. *althoferorum* has been determined to be particularly susceptible to impact from *Phytophthora species* (DEC comments). This increases the risk from indirect impact on any populations that may be exposed to *Phytophthora* due to the mining operations. The project area is in an area that is only marginal for the existence of and longer term support of *Phytophthora* (Glevan 2007). The studies of the existence of *Phytophthora* in the project area (Glevan 2007) did not identify any instances of dieback in the vicinity of the known populations of *Grevillea althoferorum* subsp. *althoferorum*, however there are two known instances of *Phytophthora* to the north of this area and within the future mining operation footprint. It is relevant to note that the CWC mining operations will not require disturbance of the areas of the known *Phytophthora* infections until some 10 years after completion of the mining of the areas where the known *G. althoferorum* populations are. This will allow considerable time to research and implement conservation measures prior to access to the areas of known *Phytophthora* infections. Also of note is the presence of *Grevillea althoferorum* subsp. *althoferorum* on a wide range of soil types from deep sands to lateritic ridges and breakways. The existence of the species on a wide range of soils (some of which are not prone to supporting *Phytophthora)* suggests that at least part of the species population will be in areas where *Phytophthora* will not be likely to start or take hold.

Problems with rehabilitation – Previous attempts to relocate *Grevillea althoferorum* subsp*. althoferorum* plants have failed and it is thought that the species is not prospective for rehabilitation or relocation. Rather than using seeds for revegetation the species is more likely to be successfully propagated by use of woody tissue under a very targeted revegetation program. An interim Recovery Plan (Stack and English 2003 – Split-leaved Grevillea (*Grevillea althoferorum)* Interim Recovery Plan 2003-2008) has been developed for the *Grevillea althoferorum* subsp. *althoferorum,* however attempts to translocate this species have to date not been successful.

CWC Avoidance, Mitigation and Management related to *Grevillea althoferorum* subsp. *althoferorum* (DRF)

CWC is committed to ensuring that a viable population of Grevillea *althoferorum* subsp. *althoferorum* remains during and after the completion of operations of the CWC mine. Part of this commitment involves:

- revising the project footprint wherever possible to minimize the direct impacts. Both the waste dump and the Southern Extension are have been altered.
- determining a mutually (to DEC and CWC) satisfactory target for maximum disturbance of these populations,
- contributing to a research program to better understand and develop techniques for successful restatement of Grevillea *althoferorum* subsp. *althoferorum* after mining impacts,
- preparing and implementing appropriate mitigation and management plans to manage any remaining impacts on the Grevillea *althoferorum* subsp*. althoferorum* population (including the species susceptibility to *Phytophthora)*, and

- preparing and implementing appropriate rehabilitation plans in consultation with experienced scientists at Kings Park Botanic Gardens to maximize the future restatement of Grevillea *althoferorum* subsp. *althoferorum* in the rehabilitated areas.

Avoidance of Grevillea Althoferorum subsp *althoferorum* (DRF)
CWC has reviewed the project footprint to minimise the direct impact on the known Grevillea *Althoferorum subsp althoferorum* populations. As a result of this review CWC has committed to avoid any direct impacts (clearing etc) from the areas named "Waste Dump" and "Southern Extension" shown on Figure 2. The area named "Waste Dump" has 174 known plants which represents 7% of the known population and the area known as "Southern Extension" has 215 known plants which represents 9% of the known population. Removal of the Southern Extension from the CWC project footprint will reduce access to some of the coal resource and the change to the location of the Waste Dump will add distance to the haulage of the initial waste material. These project changes will reduce the direct impacts on the known Grevillea *althoferorum subsp. althoferorum* species from 25% to 9%. At this time CWC does not see a way to reduce its direct impact on known Grevillea *althoferorum subsp. althoferorum* plants from any other revisions to the project footprint.

Mitigation of impacts on Grevillea *althoferorum subsp. althoferorum*
Not all of the project area has been specifically surveyed for Grevillea *althoferorum subsp. althoferorum*. Assuming that more plants of this species are found within the project footprint CWC is confident that more plants of this species can be found in secure estate. CWC has plans to do additional flora surveys in the spring of 2010 on the project footprint and in nearby secure reserves and will include surveying for Grevillea *althoferorum subsp*. a*lthoferorum* in those surveys.

CWC will consult with experienced scientists at Kings Park Botanic Gardens and DEC as to the most appropriate research program to be conducted on Grevillea *althoferorum subsp. althoferorum* to study, understand and improve the rehabilitation outcomes for Grevillea *althoferorum subsp. althoferorum*. This study will commence prior to vegetation clearing and will provide vital additional knowledge to amend the existing recovery plan.

When necessary to take any plants of this species, consideration will be given in consultation with DEC to how best to utilize those plants taken such as in research, in rehabilitation trials etc.

Management Measures for Rare Flora (*including specific measures for Grevillea althoferorum subsp. althoferorum shown in italics)*
Impacts to DRF (*including Grevillea Althoferorum subsp althoferorum)* will be minimised through the implementation of management measures described in the draft EMP (*certain additional comments are made here in relation to Grevillea althoferorum subs.p althoferorum)*. The key management measures are as follows:

Rare Flora Species

- Rare flora species will be avoided wherever possible. *(Applications to take from the project footprint will be supported by justification including an assessment of the alternative options and the ability for the relevant operational activity to be flexible.)*
- Where it is not possible to avoid the rare flora species, seed and propagules will be collected and stored for future research needs to assist in their re-

establishment in rehabilitation areas. On the basis of current knowledge of *Grevillea althoferorum* subsp*. althoferorum,* rehabilitation of this species is more likely to be successful from the use of tissue culture than seeds consideration will be given in consultation with DEC, to the use of woody tissue from disturbed *Grevillea althoferorum* subsp. *althoferorum* in research and rehabilitation. This work will be undertaken in consultation with specialists from Kings Park Botanic Gardens.

- Clearance of native vegetation will be restricted to the designated project area.
- Where it is not possible to avoid the rare species, an "application to take" will be submitted for the rare flora at the State level and a "controlled action" at the Federal level. It is recognised that Ministerial approval will be required before any rare or threatened plant can be damaged, taken or destroyed.
- Additional flora surveys will be undertaken in the project area and the SENR and LLNR to better define the extent of vegetation communities and conservation significant flora that will be impacted by the Project and that exist in these secure reserves respectively.
- Access to all non-operational areas will be restricted and personnel shall remain on designated roads and tracks.
- Topsoil and vegetation will be respread as soon as possible to assist in rehabilitation programs.
- Progressive rehabilitation of disturbed areas will occur over the life of the mine. Conservation significant flora species that will be impacted by mining will be included where possible in the rehabilitation species mix.
- Rehabilitation programs will include trials on rare flora species. *(CWC will consult with experienced scientists at Kings Park Botanic Gardens and DEC as to the most appropriate research program to be conducted on Grevillea Althoferorum subsp althoferorum to study, understand and improve the rehabilitation outcomes for Grevillea Althoferorum subsp althoferorum. This study will commence prior to vegetation clearing. Consideration will be given to the use of or updating of the Grevillea Althoferorum subsp althoferorum Recovery Plan. The research program and recovery pan will be determined in full consultation with DEC.)*

Rehabilitation and Completion Criteria

- Completion criteria will include coverage of the rare flora species. *(Given the track record of little success with rehabilitation of Grevillea Althoferorum subsp althoferorum coverage may be less for this species than other rare flora species. Suitable criteria for the trial and success of rehabilitation efforts will be determined with the DEC.)*
- Data will be collated and monitoring programs established to facilitate an understanding of the ecosystems and their functioning processes.

Summary of project impact on Grevillea Althoferorum subsp *althoferorum*

- Surveys to date have identified 2,439 individuals of this species that were previously unknown.
- The original project footprint had a direct impact on 25% of the total population.
- Revisions to the original project footprint (relocation of the “Waste Dump” and removal of the “Southern Extension” area) have reduced the direct impact to

9% of the total population. This is a reduction of 64% of the project impact.

- All individuals in the proposed mine pit footprint will be removed (currently 9% of the total population).
- All individuals along the boundary of the project and the SENR will be protected and all individuals within the dewatering infrastructure corridor will be protected.
- CWC will conduct a research program on Grevillea *althoferorum subsp. althoferorum* in consultation with specialists from Kings Park Botanic Gardens to determine the most appropriate management actions and rehabilitation practices to mitigate and manage the direct and indirect impacts on the population of Grevillea *althoferorum subsp. althoferorum*.
- CWC will endeavour to ensure that a viable population of Grevillea *althoferorum subsp. althoferorum* remains intact within the SENR and surrounding areas.

Issue 5.3.4	*"The proponent has not placed the impacts on the vegetation communities in a regional context, and on current information the impacts have not been demonstrated to be environmentally acceptable."* *"The H1 plant community is associated with species and lateritic rises in common with the 'Ferricrete floristic community (Rocky Springs type) threatened ecological community (TEC), and 93.3 percent of its extent will be impacted by the proposal."* *Raised by the Department of Environment and Conservation* *"The proposal will impact 93.3% of Vegetation community H1 in the proposal area and has been described as similar to the Rocky Springs TEC. Additionally, occurrences of Rocky Springs TEC occurs with 500metres of the proposal area. Similarly 13 of the 17 mapped vegetation communities have been described as locally or regionally significant. No demonstrated actions have been presented in the PER to avoid, minimise or reduce impact on vegetation communities or PF."* *Raised by the Department of Environment and Conservation – Terrestrial Ecosystems Branch*
Response	CWC has placed its proposed vegetation impacts in a regional contect within the Eridoon and tathra systems as mapped by Beard in 1979. Since that mapping exercise different methodologies and different scales and different naming conventions used for vegetation and flora survey work in the region by various entities over time have hampered a quantitative comparison of communities at a regional scale. CWC has utilized the best regional data sets available to make a regional analysis of the impacts possible. CWC has made all of its work available for inclusion in other regional work. It is understood that the CWC project area stretches across the boundary of the Eridoon and Tathra vegetation systems (Beard 1979). In 1994, there was approximately 60 000 ha of the Eridoon system in remnant vegetation and 113 500 ha in Tathra. The proposal will clear approximately 200 ha of the Eridoon system and 500 ha of the Tathra system (the difference from the 861 ha is most likely due to measurement accuracy). Taken in 1994 terms, this equates to approximately 0.3% of the Eridoon system and 0.44% of the Tathra system. Approximately 22.7% of the Eridoon and 12.2% of the Tathra system of the 1994 extents of remnant vegetation are in reserves. The clearing of vegetation will not significantly reduce the extent of remnant vegetation in these two systems.

The H1 community is only associated with the TEC, and using current available information is not equal to the TEC or forms what has been defined as critical habitat (Hamilton – Brown *et al.* 2004). Using the information from the first known occurrences, only 29 out of 60 taxa were common between the H1 community and the Rocky Springs location. Also the H1 community mentions lateritic rises and not necessarily the surface ferricrete expressions mentioned in the Interim Recovery Plan (Hamilton – Brown *et al.* 2004). This does preclude the H1 community as being important to ecological integrity of the TEC, however, as lateritic rises are common in the area, it is expected that this community is found in other areas unimpacted by the proposal. Of more importance to the local area is the T1 community as it forms habitat for Declared Rare Flora. This community will have approximately 72 % of its known extent left by both the CWC and CPP Projects.

CWC is proposing additional vegetation community mapping in spring 2009 and autumn 2010 and will employ all this data in further comparisons to the best regional data that is available for utilization.

CWC will consult with DEC on suitable offsets to address any significant impacts proposed on vegetation communities (refer to Commitment 1 in Section 2.3).

Issue 5.3.5	*"The survey information provided on flora and vegetation is insufficient to determine the potential impacts of the proposal."* *"The information provided on flora and vegetation contains significant discrepancies."* Raised by the Department of Environment and Conservation
Response	The Department of Environment and Conservation (Environmental Management Branch) concluded that the flora and vegetation studies had the following deficiencies. These will be discussed in turn. *"The flora survey area did not include SENR, directly east of the project area and contiguous with the project footprint, and likely to be indirectly impacted."* Given the lack of publicly available information in the area, it was considered that vegetation studies in LLNR would best serve the purposes of determining the direct impacts (*e.g* regional extent of communities) and the indirect impacts (*e.g.* groundwater drawdown on surrounding communities). Indirect impacts on SENR are to be managed using the Precautionary Principle (*e.g.* restricting access to SENR to minimise exposure to *Phytophthora* Dieback). *"Quantitative data regarding impacts on conservation significant flora are not presented"* At the time of the surveys the endeavour was to locate the sites that contain Priority Flora. The Priority Flora identified as being directly impacted in the area are; *Acacia lasiocarpa* var. *lasiocarpa* (Cockleshell Gully variant) (P2), *Calytrix purpurea* (P2), *Comesperma rhadinocarpum* (P2), *Verticordia argentea* (P2), *Mesomelaena stygia* subsp. *deflexa* (P3), *Acacia flabellifolia* (P3), *Calytrix superba* (P3), *Grevillea biformis* subsp. *cymbiformis* (P3), *Haemodorum loratum* (P3), *Hemiandra* sp. Eneabba (H. Demarz 3687) (P3), *Schoenus griffinianus* (P3), *Verticordia fragrans* (P3), *Calytrix eneabbensis* (P4), *Georgeantha hexandra* (P4), *Stylidium aeonioides* (P4), *Verticordia aurea* (P4). One Rare taxon *Grevillea*

alhtoferorum subsp. *althoferorum* will also be impacted. The definitions of these populations, in terms of size and local impact will be completed prior to disturbance and EMPs will be adjusted according to final vegetation and flora assessments.

"The majority of flora surveys were not conducted during August or September, timing that would detect the presence of two declared rare species as potentially occurring in the project area."

DEC suggests that timing the surveys in August or September would detect the presence of DRF *Paracaleana dixonii* and *Thelymitra stellata.* These species flower between October and November (Brown *et al.* 2008), which is the easiest time to identify these orchids in the field (both the flower and leaf are present). Times which flora surveys were carried out included the months of October and November.

"The surveys are not in compliance with the EPA Guidance Statement No. 51, in so far as the following information was not provided or was deficient:

- *Survey methods and sampling effort were not detailed.*
- *A measure of species richness, including methodologies applied, was not included.*
- *Species accumulation curves were not provided.*
- *Maps of vegetation condition were not provided.*
- *Information from sampling sites was not recorded.*
- *Information on the methods used to characterise and delineate the vegetation communities was absent.*
- *Lodgement of flora specimens with the Western Australian Herbarium did not occur.*
- *Proposed flora surveys have not been completed."*

The sampling times and locations surveyed were described in Appendix K to the CWC PER (Mattiske Consulting Pty Ltd 2009). The times of survey were November 2005, January 2006, October 2006, November 2007, April 2008, July 2008 and October 2008. Survey sites represented inside their respective communities within the project area were included on Figures 4-12c and d of the CWC PER (Aviva/URS 2009b) and Figures 4-11b,c, and d of the CPP PER (Aviva/URS 2009a). As a large amount of the project area has no conservation value (*i.e.* cleared areas), the rest of the area was considered to have significant values rendering a condition map pointless as the Precautionary Principle was applied. A count of species richness was not provided as all vegetation in the local area has a degree of conservation significance.

It is recognised that there are some gaps in information, largely as parts of the survey area to date have been impacted by intense and regular fires. It is intended to undertake additional DRF searches in the spring months of 2009. In particular efforts will be directed to search for *Paracaleana dixonii* and *Thelymitra stellata, Eucalyptus crispata, Eucalyptus impensa, Eucalyptus johnsonia, Tetratheca nephelioides and Grevillea althoferorum subsp. althoferorum. This wo*rk will also include searches of populations on and off proposed impact sites, including counting of plant numbers (as required now by DEC).

Additional mapping and targeted searching will be undertaken in the spring months of 2009 and early 2010 to place the work into a more regional as well as local context. This Information will be utilised to update the management plans and minimize project impacts.

	Additional assessment of the local and regional impacts will be performed whenever any additional data becomes publically available. Management plans will be updated in consultation with the DEC when appropriate.
Issue 5.3.6	*"The project will require the clearing of approximately 861 hectares of native vegetation, and directly impact two DRF, one Priority 1, 11 Priority 2, eight Priority 3, and five Priority 4 taxa."* *"Impacts from upgrade of Rocky Springs Road are not considered."* Raised by the Department of Environment and Conservation
Response	It is the position of CWC that the values reduced in the clearing process can be managed through implementation of the EMP, through offsets and progressive revegetation. CWC is committed to determining the quantitative impact this project will have on any Rare and Priority Flora, and avoiding those species that will be significantly threatened by the project. CWC is also committed to avoiding Priority Flora where possible. The Priority Flora identified as being directly impacted at this juncture are; *Acacia lasiocarpa* var. *lasiocarpa* (Cockleshell Gully variant) (P2), *Calytrix purpurea* (P2), *Comesperma rhadinocarpum* (P2), *Verticordia argentea* (P2), *Mesomelaena stygia* subsp*. Deflexa* (P3), *Acacia flabellifolia* (P3), *Calytrix superba* (P3), *Grevillea biformis* subsp. *Cymbiformis* (P3), *Haemodorum loratum* (P3), *Hemiandra* sp. Eneabba (H. Demarz 3687) (P3), *Schoenus griffinianus* (P3), *Verticordia fragrans* (P3), *Calytrix eneabbensis* (P4), *Georgeantha hexandra* (P4), *Stylidium aeonioides* (P4), *Verticordia aurea* (P4) After the spring field programme, data on the local extent of Priority Flora will be re-evaluated. There are no anticipated impacts from the upgrade of Rocky Springs Road. CWC will consult with DEC on suitable offsets to address any significant impacts proposed on Rare and Priority Flora.
Issue 5.3.7	*"The construction of the mine will result in the clearing of 861 ha of native vegetation."* Raised by the Wildflower Society of Western Australia
Response	Refer to the response to Issue 5.3.6.
Issue 5.3.8	*"The proponent has not demonstrated a commitment to minimize clearing of sensitive native vegetation and flora. The waste dump is currently located on native vegetation linked to southern beekeepers reserve where a number of rare flora and fauna were recorded and should be moved to adjacent freehold farmland."* Raised by the Public Submission #1
Response	Section 7.2.3 of the PER states that impacts to vegetation will be minimized through the implementation of management measures described in the EMP (PER Appendix C). The key management measures that are defined in this section of

	the PER include restricting clearing of native vegetation to only that area necessary for operations. The vegetation that is to be cleared are a part of one of the many links to nature reserves to the west of the project area (such as Stockyard Gully Reserve, etc). These reserves form an almost continuous belt of vegetation south to Southern Beekeeper's Nature Reserve (it is approximately 40 km south west of the project). As there is other linking vegetation leading to the western nature reserves the impact upon the link from essentially SENR to Southern Beekeepers Reserve should be negligible.
Issue 5.3.9	*Indirect impacts on the South Eneabba and Lake Logue Nature Reserves have not been addressed.* Raised by the Department of Environment and Conservation
Response	This issue was addressed in Section 7.2.2 of the PER. The PER section describes the potential for indirect impacts on flora and vegetation within the SENR and LLNR, and indicates that all of these indirect impacts on vegetation are applicable to the SENR and the LLNR which border the project area. One of the objectives of the determination of flora and vegetation values in LLNR was to predict groundwater drawdown impact on LLNR. In order to clarify any groundwater impacts, work has been undertaken (see Section 7.12.2 and Appendix K of the PER) and is being undertaken on the LLNR. No significant long term impacts are predicted, but it is intended to further clarify the significance of any potential groundwater drawdowns more fully after further studies in spring 2009 and autumn 2010 on both LLNR and also SENR. A suitable buffer distance will be maintained between the mine site activities and the boundary of the SENR, to protect the values of the reserve from direct and indirect impacts such as dust deposition, altered hydrology and the introduction/spread of weeds and disease. CWC will detail rehabilitation strategies as part of the mine approvals that will be applied to a variety of landform and ecosystem types.
Issue 5.3.10	*"CCWA believe that the impact on already fragmented Kwongan Heath vegetation (one of the most species-rich vegetation type anywhere in the world) as are result of extensive clearing associated with the mine site and transmission lines is unacceptable. CCWA understands that a significant proportion of the clearing proposed for the transmission lines will take place in a nature reserve which is a wholly unacceptable outcome for a project of this type."* Raised by the Conservation Council of WA
Response	Clearing for the transmission lines has been addressed in the response to submissions for the Coolimba Power Project as the referred infrastructure corridor is attached to that Project. Therefore, the response to this submission will only focus on clearing for the mine site. The proponent agrees that the Kwongan Heath of the Eneabba area is of world importance, but disagrees that the clearing is unacceptable. The CWC project area stretches across the boundary of the Eridoon and Tathra vegetation systems (Beard 1979). In 1994, there was approximately 60 000 ha of the Eridoon system

in remnant vegetation and 113 500 ha in the Tathra system (based on the most recent determination of the extent of remnant vegetation). The proposals to develop the CPP and CWC Projects will clear approximately 200 ha of the Eridoon system and 500 ha of the Tathra system (the difference from the 861 ha is most likely due to measurement accuracy). Taken in 1994 terms, this equates to approximately 0.3 % of the Eridoon system and 0.44% of the Tathra system. Approximately 22.7 % of the Eridoon and 12.2% of the Tathra system of 1994 extents of remnant vegetation are in reserves. The clearing of vegetation will not significantly reduce the extent of remnant vegetation in these two systems. An offset package will be developed to mitigate the impact of vegetation clearing.

Issue 5.3.11	*It is unclear from the PERs how impacts on the EPBC Flora species Grevilliea Althoferorum, Eucalyptus crispate, Eucalyptus impensa and Eucalyptus johnsonia will be addressed.* Raised by the DEWHA
Response	During the preparation of the PER, there were five known locations of *Grevillea althoferorum* subsp. *althoferorum* in proximity to the Central West Coal Project including three east of the eastern edge of the proposed pit and two along Eridoon Rd (currently contained within the 12 m road reserve (Stack and English 2003). Both of these locations will not be directly affected by the proposal. Indirect impacts on these locations (*e.g.* groundwater drawdown, *Phytophthora* Dieback, etc) have been addressed (Table 1). However, after the preparation of the PER, it became apparent that there were five populations within the direct footprint. Refer to the Response to Issue 5.3.3 for further details on this species. The *Eucalyptus* spp. Were not located during field surveys conducted for the CWC prior to the issue of the PER. Subsequent to the release of the PER further searches for these *Eucalyptus* species has been conducted with no identifications of the *Eucalyptus* spp. Within the CWC Project footprint. It is felt that there is a very low risk that these species will be impacted directly by the project development. Future occurrences of these species will be avoided (to avoid direct impacts), and other measures that protect other vegetation and flora, should provide protection from indirect impacts.

5.4. Cumulative Impacts

Issue 5.4.1	*"The cumulative impacts of this project, in conjunction with the Coolimba Power Station, Tiwest's Falcon and Iluka's Eneabba Expansion projects, have the potential to cause loss of significant flora values of the Lesueur grey vegetation subsystem identified by Hopkins, Griffin and Langley for the West Midlands study."* *Raised by the Department of Environment and Conservation* *"These projects (Coolimba Power Project and the Central West Coal Mine), in combination with the Iluka expansion and Tiwest Falcon expansion have the potential to significantly impact this area in the long term via the removal of restricted vegetation communities, critical habitat for threatened flora, altered surface and ground water conditions, pollution of groundwater and drawdown effects on groundwater dependent ecosystems."*

	Raised by the Department of Environment and Conservation – Midwest Region
Response	The PER documentation for both projects clearly identified that the two projects were interdependent and integrated. The Projects are being presented as separate projects as they are owned by separate legal entities and are quite different projects – though related. Where the impacts of the two projects are cumulative the PER documentation has made a cumulative assessment of the combined impacts so that the environmental impact assessment can be made on the cumulative impacts. Refer to Issues 4.2 for further detail. Throughout the EIA process including during the review of the ESD and the Draft PER there was no requirement for the project to consider the impact of other projects in the area. Where possible existing impacts have been included in the consideration of baseline existing environmental condition and impacts such as the utilization of dust impacts from nearby operations. The inclusion of impacts from potential projects that are not yet documented and publically available is not possible. Estimation of impacts may lead to erroneous conclusions and decisions and would not be supported. Similarly, consideration of data and reports that are draft or currently being prepared and are not publically available is not possible. The Central West Coal and Coolimba Power Projects do have the potential to impact directly upon locally restricted vegetation and flora (EPA 2004b) (summarized in Table 1). The main impacts are: • vegetation clearing for both projects of 910 ha, most of which will be due to the mine pit; and • impacts on two DRF species and Four Priority 2, ten Priority 3 and six Priority 4 species due to clearing. CWC is of the position that it will be able to restrict its direct impacts on the two DRF species *Tetratheca nephelioides* and *Grevillea althoferorum* subsp. *althoferorum* to levels that are acceptable to the DEC. CWC has also committed to avoiding Priority Flora where possible and providing offsets for disturbance of DRF. The restricted vegetation types are expected to exist in secure tenure nearby. There is a possibility that the CWC and CPP Projects and the Iluka and Tiwest Expansion projects have potential to cause loss of significant flora values of the Lesueur grey vegetation subsystem (similar to Beard 1979 “Eridoon” system) identified by Hopkins, Griffin and Langley for the West Midlands study (unpublished and unavailable). However, as the documents describing Tiwest’s Falcon and Iluka’s Eneabba Expansion are not yet publicly available the cumulative impact of all projects cannot be commented on. This has previously discussed with the EPA, who accepts that a cumulative impact assessment of the four projects cannot be conducted at this time due to a lack of publicly available information on the Iluka and Tiwest Projects. The impact on the Eridoon system is described above.
Issue 5.4.2	*The PER has not taken into account the proposed coal mine, power station and the mineral sand mining in the area and the proposed extensions by Iluka. The overall impact of the projects should be considered in a regional context and when*

	this is done it will be apparent the project should not proceed. The conservation estate has already been significantly impacted by projects such as mining and exploration e.g. the Beekeepers Reserve and the SENR . Raised by the *Wildflower Society of Western Australia*
Response	The cumulative impacts of the Coolimba Power and Central West Coal Projects have been identified, assessed and reported as shown in Table 1 above. Consideration was given to the possibility of considering the cumulative impacts with other potential projects in the region, however it was determined that this would not provide appropriate outcomes. Central West Coal discussed this with the EPA and the DEC and it was determined that the project would not be required to consider the cumulative impacts of the other projects in the region. The reasons for this are as shown below: • The definition of the impacts from other projects was not adequately available to allow a reasonable assessment of the cumulative impacts, i.e. we did not know what the impacts of other projects would be at the time that the PERs were prepared. • The possibility of the other projects project definitions changing and thereby the impacts changing were too high for a suitable assessment of the other projects impacts, i.e. the other project footprints were subject to revision. • The difference in timing of the release of data related to the various projects. • Matters of commerciality between the various projects with regard to the data of project outlines and impacts.

5.5. Fauna

Issue 5.5.1	*The PER fails to adequately assess the fauna assemblage in a regional context. This is mainly compounded by major errors in the regional fauna data provided in Appendix C.* *For example the dataset ascribed to Dell et al. (1979) is not from this data source and includes an assemblage with many arid distributed species. All other data sets in this table need to be checked for accuracy and likely occurrence of species in the region of the project area.* *Raised by the Department of Environment and Conservation*
Response	The data set described above (Dell *et al.* 1979) was in fact incorrect. A second survey attributed to Dell *et al.* 1979 (from Wilroy Nature Reserve) was previously deleted as it was thought to be too far from the project area to be relevant. Unfortunately the wrong set of Dell *et al.* 1979 data was deleted and we apologise for this error. Appendix C has since been revised and the attached document adjusted to reflect this. Adjustments to Appendix C include: • One native mammal was added and one introduced mammal species was removed • 56 bird species were added. The majority of such were deleted in the

previous version of the report due to the very low likelihood of occurrence in the project area (typically wetland species). As they were recorded in the literature cited in this document we have decided to keep them in this version of our report to avoid any further confusion.

- 22 reptile species were removed as they are arid species that no longer occur in the revised Appendix C.
- 2 amphibian species was removed and 1 species was added, also due to the revision of Appendix C.

Due to the above revision a further four species of conservation significance were added to the report, although all were of low likelihood of occurrence and as such do not require a detailed discussion. To further refine the report all other detailed descriptions of conservation significant species that have a low likelihood of occurrence have been removed.

Table 2 (below) describes each of the species of conservation significance and replaces Table 7-6 in the PER.

The revision of regional faunal assemblage has not altered the species of conservation significance that potentially occur in the project area and as such no changes to management strategies or impact assessments are anticipated.

Table 2: Potentially Occurring Fauna of Conservation Significance (replaces Table 7-6 form Section 7.9.2 in the PER)			
Scientific Name	**Common Name**	**Conservation Significance**	**Description**
Carnaby's Black-Cockatoo	*Calyptorhynchus latirostris*	*EPBC Act* - Endangered Species; *Wildlife Conservation Act 1950* - Schedule 1	This species was found during the surveys conducted by *ecologia*. No direct impact to this species is anticipated as a result of the Project. As discussed in Section 4.8, it is unlikely that this species breeds within the project area or SENR. The nearest known breeding location is approximately 40 km south-east of the project area at Coomallo Nature Reserve. Kwongan heath is considered to be an important feeding resource for Carnaby's Black-Cockatoo, therefore clearing for the Project, or degradation of this vegetation, may reduce available food resources and impact local populations. However, there are large areas of Kwongan heath in secure reserves in the region, such as Beekeepers, Coomallo, Drovers, South Eneabba, Lake Logue, Badgingarra and Lesueur Reserves. Within the Conservation Estate in the region shown on Figure 4-18 there is approximately 152,000 ha of feeding habitat for Carnaby's Black-Cockatoo.
Rainbow Bee-eater	*Merops ornatus*	*EPBC Act* - Migratory	This species was found during the surveys conducted by *ecologia*. Habitat utilised by this species will be cleared for the Project. The sandy soils in the project area are suitable for nesting, although an existing lack of large trees from which to forage makes it less likely that they would choose these areas to breed. Adults should be capable of moving to the adjacent SENR which contains the same habitat types. However, this species could be directly impacted during the nesting season between July and January. During this period the birds are vulnerable to clearing; adult birds may abandon their chicks if disturbed and chicks may be killed by machinery during clearing. Indirect impacts to vegetation outside the project area, especially the SENR, have the potential to reduce available habitat for the species.
Fork-tailed Swift	*Apus pacificus*	*EPBC Act* - Migratory	The Project is not expected to impact on this species due to the aerial nature of this species and its largely nomadic nature.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	*EPBC Act* - Migratory	This species is restricted to coastal habitats, which are not relevant to the project area. Therefore, this species is unlikely to be impacted by the Project.
Eastern Great Egret	*Ardea alba*	*EPBC Act* - Migratory	There are no expected impacts on this species, although birds may be attracted to the water ponds.

Table 2: Potentially Occurring Fauna of Conservation Significance (replaces Table 7-6 form Section 7.9.2 in the PER)			
Scientific Name	**Common Name**	**Conservation Significance**	**Description**
Cattle Egret	*Ardea ibis*	*EPBC Act* - Migratory	The Project is not expected to impact on this species as it has not been previously recorded in the region. In addition, areas of suitable habitat can be found in the farmland surrounding the project areas.
Common Greenshank	*Tringa nebularia*	*EPBC Act* - Migratory	No suitable habitat was recorded in the project area therefore there are no expected impacts on this species, although birds may be attracted to the water ponds.
Wood Sandpiper	*Tringa glareola*	*EPBC Act* Migratory	No suitable habitat was recorded in the project area therefore there are no expected impacts on this species, although birds may be attracted to the water ponds.
Peregrine Falcon	*Falco peregrinus*	*Wildlife Conservation Act 1950* - Schedule 4	Any individual's resident within the project area may be indirectly impacted through loss of fauna habitat and a reduction in prey abundance may reduce the available foraging habitat. Development of the Project is not expected to directly impact this species.
Rufous Fieldwren (western wheatbelt population)	*Calamanthus campestris montanellus*	DEC - Priority 4	This species was found during the surveys conducted by *ecologia*. Habitat utilised by this species will be cleared for the Project. Adults should be capable of moving to the adjacent SENR which contains the same habitat types. However, this species could be directly impacted during the nesting season between July and January, as birds and fledglings may be unable to escape. Indirect impacts to vegetation outside the project area, especially the SENR, have the potential to reduce available habitat for the species.
Australian Bustard	*Ardeotis australis*	DEC - Priority 4	It is anticipated that the Project will not impact on this species. The Australian Bustard could use the open vegetation, particularly the cleared agricultural land and regenerating heath, within the project area, but it is expected that this species is highly mobile and known to move away from any disturbances such as vehicles and construction machinery operations.
White-browed Babbler	*Pomatostomus superciliosus ashbyi*	DEC - Priority 4	The Project is not expected to directly or indirectly impact this species, as potentially suitable habitat is not found within the project area.
Crested Bellbird	*Oreoica gutturalis (southern)*	DEC - Priority 4	If it is present, this species is not expected to be significantly impacted by the Project. Adult birds are expected to escape to the nearby areas of suitable habitat found in nearby nature reserves. Clearing during the breeding season between August and December may kill nestlings.

Table 2: Potentially Occurring Fauna of Conservation Significance (replaces Table 7-6 form Section 7.9.2 in the PER)			
Scientific Name	**Common Name**	**Conservation Significance**	**Description**
Brush Bronzewing	*Phaps elegans*	DEC - Priority 4	The Project is not expected to directly or indirectly impact this species, as no suitable habitat has been observed in the project area.
Hooded Plover	*Charadrius rubricollis*	DEC - Priority 4	There are no expected impacts on this species, although birds may be attracted to the water ponds.
Grey Falcon	*Falco hypoleucos*	DEC - Priority 4	This species is not expected to occur in the region as it typically occurs in arid northern areas of Western Australia. Also no suitable habitat was recorded in the project area. Therefore, this species is unlikely to be impacted by the Project.
Bush Stone-Curlew	*Burhinus grallarius*	DEC - Priority 4	It is anticipated that the Project will not impact on this species. The Bush Stone-Curlew could use the open vegetation, particularly the cleared agricultural land and regenerating heath, within the project area and shelter in denser woodland adjacent to the project area, but this species is highly mobile and known to move away from any disturbances such as vehicles and construction machinery operations
Gilled Slender Blue-tongue	*Cyclodomorphus branchialis*	*Wildlife Conservation Act 1950* - Schedule 1; DEC Vulnerable	This species could potentially occur as there is suitable habitat in the project area. As this species is unable to move quickly, individuals located within the disturbance path will likely be directly impacted during clearing. Indirect impacts through loss of suitable habitat are not anticipated to be significant as similar habitat is found nearby in the SENR.
Woma	*Aspidites ramsayi (south-west population)*	*Wildlife Conservation Act 1950* - Schedule 4; DEC - Priority 1	This species has not been recorded in the region since 1989 and is considered unlikely to be present. If individuals are present, they may be directly affected by clearing. Any displaced individuals may move to habitat within the SENR.

Table 2: Potentially Occurring Fauna of Conservation Significance (replaces Table 7-6 form Section 7.9.2 in the PER)			
Scientific Name	**Common Name**	**Conservation Significance**	**Description**
Black-striped Snake	*Neelaps calonotos*	DEC - Priority 3	This species was found during the surveys conducted by ecologia. Individuals will be directly impacted by clearing, with population numbers within the project area expected to decline. This species is likely to inhabit the adjacent SENR, which may provide a refuge. Therefore, indirect impacts to vegetation in the SENR have the potential to reduce available habitat for the species. In some areas, this species may be able to take refuge in deeper sands during disturbance. If this occurs, individuals in cleared areas adjacent to undisturbed vegetation should be able to take refuge in the vegetation. Individuals in areas without adjacent vegetation may be lost. This species may be indirectly impacted by soil compaction for access tracks, which create a barrier and or require the snake to surface, potentially resulting in increased risk of predation.

5.6. Impacts on EPBC listed species

Issue 5.6.1	*"It is … unclear from the PERs, how impacts on the Carnaby's Black-Cockatoo will be mitigated."* *Raised by the DEWHA* *"Further clarification of the impact on the Carnaby's Black-Cockatoo is required to allow the Minister to be able to make a decision on approval of the projects. This should include mitigation measures and whether off-sets for loss of Carnaby's Black-Cockatoo foraging habitat will be proposed."* *Raised by the DEWHA* *"The proposal has the potential to significantly impact on Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) foraging habitat"* *Raised by the Department of Environment and Conservation*
Response	As stated in the PER it has been assessed that: *"No significant direct or indirect adverse impact to this species or any population of the species is anticipated as a result of the Project."* This assessment is relevant to both the individual impacts of the two separate projects (Coolimba and CWC) and the cumulative impacts of both projects. The assessment of no significant adverse impact is based on the following points: • There are large areas of Kwongan Heath in secure reserves in the region, such as South Eneabba, Lake Logue, Beekeepers, Coomallo, Drovers and Lesueur reserves. The immediate area has a total of 152,000 ha of native vegetation in Conservation Estate and the wider region (area covered by the 250,000 maps of Dongara, Hill River, Perenjori and Moora) has 991,000 ha of native vegetation which is 23% of the land covered by those maps. • Cumulative clearing over 30 years is limited to 870ha (860ha private land and 10ha nature reserve). • It is unlikely that this species or the local population breeds within the project area or SENR. The nearest known breeding location is approximately 40 km south-east of the project area at Coomallo Nature Reserve. The Project's impacts on Carnaby's Black Cockatoo will be mitigated in the following ways: • Progressive rehabilitation will occur on all but approximately 10ha of this cleared land. • Significant portions of the cleared land will be rehabilitated within 10 years of the commencement of the project. • Onsite mitigation measures including the inclusion of flora species that are suitable for Carnaby's Black-Cockatoo foraging in the rehabilitation efforts will

be incorporated in rehabilitation planning. Suitable targets for concentration of foraging species and survival rates will be discussed with the DEC and DEWHA.

- Section 5 of the Environmental Management Plan describes the management steps to minimise impact on Carnaby's Black-Cockatoo and other fauna species. Included amongst the 13 specific actions within Section 5 are 10 actions that are related to management of the impact on Carnaby's Black-Cockatoo. These include:

1) Vegetation clearing will be restricted to that which is necessary, and disturbed areas (including construction areas) will be rehabilitated as soon as practicable.
2) Fire prevention strategies will be an integral component of risk assessments for construction contractors. All vehicles will be fitted with fire extinguishers and site personnel will be trained in their use.
4) Dust control and suppression measures will be implemented in accordance with the Dust Management Plan, which is discussed in 8.
5) Directional lighting will be used to minimise light spill outside of the project area.
6) Dieback management will be undertaken in accordance with the Flora and Vegetation Management Plan, as described in Section 4.5.3.
7) Weed management practices will be implemented in accordance with the Flora and Vegetation Management Plan which is discussed in Section 4.5.
8) Driving on site at dusk or dawn and at night will be minimised to reduce impacts to fauna which are active during these times.
9) Speed restrictions will be in force around the site and fauna on roads will be avoided, if this can be done safely.
10) All ponds associated with the Project will be fenced to prevent entry by fauna.
11) Sightings of Carnaby's Black-Cockatoo and any observations of Carnaby's Black-Cockatoo activities will be reported to on site environmental personnel for collation and reporting to relevant stakeholders.

Issue 5.6.2	*"It is unclear from the PERs how impacts on the EPBC Flora species Grevilliea allthoferorum, Eucalyptus crispate, Eucalyptus impensa and Eucalyptus johnsonia will be addressed by the two proponents."* *Raised by the DEWHA*
Response	During the preparation of the PER, there were five known locations of *Grevillea althoferorum* subsp. *althoferorum* in proximity to the Central West Coal Project including three east of the eastern edge of the proposed pit and two along Eridoon Rd (currently contained within the 12 m road reserve (Stack and English 2003). Both of these locations will not be directly affected by the proposal. Indirect impacts on these locations (*e.g.* groundwater drawdown, *Phytophthora* Dieback, etc) have been addressed (Table 1). However, after the preparation of the PER, it became apparent that there were five populations within the direct footprint. CWC is waiting on the confirmation of population sizes before determining if additional surveys are required. CWC is also committed to reaching a mutually (to DEC and CWC) satisfactory target for maximum disturbance of the DRF species Grevillea althoferorum subsp. althofero*rum*, and avoiding Priority Flora where possible.

Issue 5.6.3	*"It is unclear from the PERs how impacts on the EPBC species Rainbow Bee-eater will be addressed."* *Raised by the DEWHA*
Response	As stated in the PER it has been assessed that: *"No significant direct or indirect adverse impact to this species or any population of the species is anticipated as a result of the Project."* This assessment is relevant to both the individual impacts of the two separate projects (Coolimba and CWC) and the cumulative impacts of both projects. The assessment of no significant adverse impact is based on the following points: • There are large areas of Kwongan Heath (similar habitat to that being cleared) in secure reserves in the region, such as South Eneabba, Lake Logue, Beekeepers, Coomallo, Drovers and Lesueur reserves. The immediate area has a total of 152,000 ha of native vegetation in Conservation estate and the wider region (area covered by the 250,000 maps of Dongara, Hill River, Perenjori and Moora) has 991,000 ha of native vegetation which is 23% of the land covered by those maps. • Cumulative clearing over 30 years is limited to 870ha (860 private land and 10ha nature reserve) The projects impacts to the Rainbow Bee-eater will be mitigated in the following ways: • Progressive rehabilitation will occur on all but approximately 10ha of this cleared land. • Significant portions of the cleared land will be rehabilitated within 10 years of the commencement of the project. • Flora species that are suitable for Carnaby's Black-Cockatoo foraging will be included in the rehabilitation efforts. • Section 5 of the Environmental Management Plan describes the management steps to minimise impact on Rainbow Bee-eater and other fauna species. Included amongst the 13 specific actions within Section 5 are 10 actions that are related to management of the impact on Rainbow Bee-eater. These include: 1) Vegetation clearing will be restricted to that which is necessary, and disturbed areas (including construction areas) will be rehabilitated as soon as practicable. 2) Fire prevention strategies will be an integral component of risk assessments for construction contractors. All vehicles will be fitted with fire extinguishers and site personnel will be trained in their use. 4) Dust control and suppression measures will be implemented in accordance with the Dust Management Plan, which is discussed in 8. 5) Directional lighting will be used to minimise light spill outside of the project area. 6) Dieback management will be undertaken in accordance with the Flora and Vegetation Management Plan, as described in Section 4.5.3.

7) Weed management practices will be implemented in accordance with the Flora and Vegetation Management Plan which is discussed in Section 4.5.
8) Driving on site at dusk or dawn and at night will be minimised to reduce impacts to fauna which are active during these times.
9) Speed restrictions will be in force around the site and fauna on roads will be avoided, if this can be done safely.
10) All ponds associated with the Project will be fenced to prevent entry by fauna.
13) The potential for Rainbow Bee-eaters to breed in sandy areas and embankments will be monitored and if present, nest tunnels will be avoided if possible.

5.7. Rehabilitation

Issue 5.7.1	*"Council does have some concerns on the lake being left behind and the quality of the water as it states in the PER that the concentration of salts in the final pit void will increase over time. The PER does not appear to cover what action will be taken to ensure the area is not used for recreation purpose and the effect of the rising salt levels will have on the surrounding areas ."* *Raised by the Shire of Coorow*
Response	The PER at Section 8.2 discusses the potential environmental impacts from the proposed project with regard to the disposal of saline residues from the Coolimba Power Project evaporation ponds. The Draft Environmental Management Plan in Appendix C provides detail on the plans of management. The predicted concentration of salts in the final void was based on disposal of the saline residues below the water table. Modelling of this scenario "… *did not accommodate thermal gradient effects or density effects, both of which are thought to be potential influences on the behaviour of the hyper-saline plumes that would initiate from bulk disposal of saline residue in mine backfill where it would be exposed to the recovering groundwater table after mine closure. Therefore, the findings of the modelling are considered to be preliminary."* *"Consequently, CWC intends to conduct further modelling to include thermal gradient effects, plume density effects, and more precise final pit void geometry to confirm the effects of saline residue co-disposal. While it is anticipated that co-disposal of saline residue with mine backfill below the final watertable will prove the best solution with minimal environmental impact, the downstream effects of co-disposal of saline residue in mine backfill below the watertable are not able to be confidently predicted at this time.* *"Until that uncertainty is resolved, CWC proposes to dispose of saline residue above the water table in cells in mine backfill. If co-disposal with waste rock below the water table proves environmentally sound, CWC will adopt that course. Co-disposal of salt residue will not be required for up to four years after commencement of operations.* *"Consequently, this PER seeks approval for disposal of saline residue in cells in mine backfill above the water table, and conditional approval for co-disposal of saline residue in mine backfill below the watertable."* PER Section 8.2.2 Section 8.2.3 of the PER identifies the management steps that the Project

proposes including:

- *Saline solids will be placed in cells in mine backfill maintained at the southern end of the mine where the groundwater table is sufficiently deep to allow burial well below the planned rehabilitated surface and above the watertable which recovers after mining.*
- *CWC will conduct further studies to confirm the characteristics and behaviour of leachate arising from waste rock and co-disposal of ash and saline residue. This will include kinetic leach testing of waste rock and ash, and confirming the chemistry of saline residue, and development of methods to reliably and economically categorise waste streams in terms of their capacity for generating AMD, increased salinity and metal concentration.*
- *CWC will conduct further solute transport modelling to include thermal gradient effects, plume density effects, and more precise final pit void geometry to confirm the effects of saline residue co-disposal in mine backfill.*
- *CWC will implement groundwater quality monitoring as part of the draft EMP (Appendix C) and will establish water quality criteria for major groundwater users in the area in consultation with the DEC and DoW.*

Recreation Purposes
The Project will address the concerns of the Shire of Coorow by ensuring that the final void is not accessible for recreation purposes if there is a human health risk. An assessment of human health risk an d the management required to address it if applicable will be included in the closure plan prior to implementation.

Effect of Rising Salt Levels
The solute transport modeling (refer to Appendix U in the PER) shows that the groundwater levels will return to about 4m below the existing groundwater levels and that the void will act as a local groundwater sink capturing all the solute to the void and a small area around the void. The rising salt levels in the void are only expected to have very localised impacts.

Refer to Commitment 8 Section 2.3 for the updated commitment by the project on this matter.

Issue 5.7.2	*"The PER has not demonstrated that the proposed rehabilitation aims can be met."* *Raised by the Department of Environment and Conservation* *Further comment from DEC Midwest Branch* *"Section 3.5.1 (pages 3-16) of the PER report states that 'the landform and profile reconstruction will aim to return surface infiltration rates to that existing prior to disturbance.' However, effective and long-term rehabilitation will require reconstruction of different soil profile characteristics, unlikely to be achieved with currently available knowledge or methods."* *"Appendix G, Preliminary Closure Plan, Section 5 (page 5-2) mentions that, 'the backfilling of the pit with overburden and coal combustion ash may result in a reconstructed soil profile with different soil characteristics, including physical, mineralogical, saline content, dispersive characteristics, and cation imbalances to the pre-disturbance soil profile. These characteristics could affect the success of the rehabilitation through inappropriate plant growth medium characteristics, water*

retention characteristics or through excessive erosion' ".

Response THE CWC Rehabilitation goals and processes are outlined in the Draft Progressive Rehabilitation Plan - Appendix F to the CWC PER.

The Draft Progressive Rehabilitation Plan outlines the expertise assembled to report on the rehabilitation issues to be addressed, the key issues and the methods of addressing those issues.

In summary:

Issue	Method of Addressing
Climate – hot dry summers, high evaporation	Careful planning of timing of rehabilitation activities.
Little elevation in landforms	Attention to detail in surface drainage reconstruction.
Soil Structures	Use of weathering ferricrete and the associated elevated clay content for water holding potential for vegetation use.
Majority of the plant species are herbs or small shrubs that have shallow root systems	Appropriate soil structure to be maintained.
High infiltration rates	Ensuring that surface infiltration rates are similar to that existing prior to disturbance.
Physical and chemical characteristics of the reconstructed profile	May require soil conditioning or soil selection techniques, will require ongoing soil testing.
Existence of palaeo drainage channels	Rehabilitation earthworks will need to reinstate the hydraulic features.
Existence of Rare and Priority flora	Special attention may be given to re-establishment of Priority Flora, Retention of cleared flora for rehab.
Existence of Rare and Priority Fauna	Special attention may be given to re-establishing habitat for Rare and Priority Fauna.

The use of existing expert consultancies that have experience in the area will greatly assist the success of the rehabilitation outcome. The project will be able to learn from the existing rehabilitation efforts in the area and improve from past outcomes.

The predicted outcome is for a landform that is consistent with the existing landform with no significant changes to surface drainage and minimal changes to vegetation diversity. Rehabilitation will support the return and survival of existing fauna.

Rehabilitation will include consideration of subsoil profile characteristics as well as topsoil. The EMP and Draft Progressive Rehabilitation Plans include consideration of soils from pre-disturbance through mine backfill, topsoil restructure and vegetation rehabilitation.

	The rehabilitation effort will integrate hydrology, soils and vegetation disciplines to achieve the best rehabilitation outcomes.
Issue 5.7.3	*"The landforms of the area will be greatly modified and not be returned to their original contours."* *Raised by the Department of Environment and Conservation*
Response	The landforms of the area will be modified but will be consistent with the surrounding landscape. The PER at Section 7.6 describes the extent of the modification and the management of the rehabilitation effort to achieve the objectives of ensuring that the modified areas will be consistent with the existing landforms and land uses. "*During the life of the operational phase approximately 516 Mbcm of waste rock will be mined. This waste will be disposed of either as in-pit backfill, or in out-of-pit waste dumps within the stockpile management corridor. The majority of waste rock will be utilised in the backfill within the limits of the pit excavation.* *Rehabilitation of the backfill and stockpile management corridor will ensure consistency with existing landforms, and land uses. This will include a restriction to gentle slopes with overall elevations in keeping with the existing landforms. Drainage lines that traverse the mine path before mining occurs will be returned to a functional post-mining condition."* *"The waste rock dump will be contoured and revegetated and will remain as a permanent feature after mine closure. The surface of the backfilled pit will also be contoured and revegetated (to premining use) progressively.* *The backfilled pit will be surcharged (overfilled) in some areas and under-charged (under-filled) in other areas reflecting the variable pit geometry and material volume balance.* *The rehabilitated landforms will be in keeping with original landforms, and surface drainages will be reinstated where appropriate and maintained in a functional state. Field evidence indicates that the palaeo drainage channels are acting as conduits for the east-west flow of subsurface water.* *The location and nature of the buried palaeo drainage channels will be confirmed prior to landscape and profile reconstruction with specific attention given to the depth and nature of the gravels. Once this has been determined, channel reinstatement will include replacement of a high permeability horizon, at the appropriate depth, to simulate pre-disturbance conditions." Extracts from the PER Section 7.6.2 and 7.6.3.* Refer to the Response to Issue 5.7.2 above for further details of the rehabilitation strategies and predicted outcomes.
Issue 5.7.4	*"The proponent does not have a record of revegetation in the Kwongan area of Western Australia and we don't believe they would be able to meet community expectations or for that matter that of the government agency."* *Raised by the Wildflower Society of Western Australia*
Response	The proponent intends to reinstate a stable landscape with native species in appropriate areas. Whilst the proponent is not currently operating a mine, it is able to draw on a range of staff, consultants and nearby industries that have undertaken extensive rehabilitation activities. CWC will make every effort to maximize the return of native species and values in its rehabilitation efforts on existing vegetated areas. Further, the proposed offset package provides additional protection to many local values that would not have otherwise been protected.

CWC will implement a rehabilitation program that will take into consideration the lessons learned from previous and current rehabilitation efforts in the Eneabba region. A comprehensive monitoring program will also be implemented so that the rehabilitation program can be revised and improved during the life of the Project.

Issue 5.7.5	*The final pit containing the residue of 30 years of mining would become progressively more saline through evaporation.* *24,600,000 tons of ash will eventually be buried in the pits, the leachate from which they hope will concentrate in the final pit void.* *Considering the sandy nature of the site it is very likely that the leachate will filter gradually into local aquifers and creek systems, despite the precautions taken.* *The proponents offer no supporting evidence of the safety of such a practice.* *Will the area be safe with regards to 50 or 100 year weather events?* *Raised by Public Submission #2*
Response	The PER at Section 8.2 discusses the potential environmental impacts from the proposed project with regard to the disposal of ash and saline residues from the Coolimba Power Project. With regard to disposal of ash alone, the Solute Transport study completed by URS found: *"After ash co-disposal, salt and metal concentrations in local groundwater are expected to remain within ANZECC (2000a, 2000b) guideline values for marine quality water, but may exceed the 90% and 95% trigger values for freshwater aquatic ecosystem protection and also livestock drinking water guidelines. The metals that may exceed these guidelines are Al, As, B, Cr, Mo, and Zn. (URS, 2008).* *"Given that the groundwater affected by the small increases in some salt and metal concentrations is unlikely to be exposed to downstream ecosystems, or abstracted by potential users, and that dilution effects are likely to make the increases in salt and metal concentrations insignificant, it is expected that co-disposal of ash in mine backfill will not adversely impact groundwater quality.* *"The solute transport model simulation (URS, 2008) presents a worst case scenario. The simulation indicates that leaching and solute dilution would be greatest immediately following disposal of ash to the pit. Over time, the concentration of the leached solution was predicted to continue to dilute." Extracted from PER Page 8-4 and 8-5.* This solute transport modelling work included 500 year modelling and was prepared using best practice modelling by experienced professionals demonstrating the long term safety of the practice and reliability of the outcomes. The increasing salt and metal concentration in the final pit void is expected to have negligible impact on local groundwater quality because groundwater flows in the immediate vicinity will be toward and into the void. The water level in the final pit void is expected to stabilise within 4m of the original water table and the residual drawdown cone is expected to stabilise within 60 years of mine closure. CWC will monitor and report groundwater quality during the mine life to confirm

understanding of groundwater movement and quality issues.

The Project will be designed to handle most weather events, final design criteria will be determined in discussion with the DEC as part of the Part V approvals process.

Issue 5.7.6	*"Potentially harmful metal and metalloid accumulation in the Pit Lake system and its consequent impact on fauna had not been adequately assessed in terms of closure management."* *Raised by the Department of Environment and Conservation* *The PER Executive Summary (page no. 13) and Appendix H, Geochemistry Report (page 42) indicates that "... leachate from coal combustion ash is likely to contain some dissolved metals in concentrations that may exceed the applied water quality guidelines. The key metals of concern are arsenic (As), boron (B), chromium (Cr), copper (cu), molybdenum (Mo), selenium (Se) and zinc (Zn)".* *Of particular concern to DEC, are metals and metalloids that have the potential to bioaccumulate in pit lake organisms, and biomagnify in food webs causing significant damage to fauna utilising the artificial water resource (especially birds).* *Recommendation 6: The proponent should include 'post closure' management criteria indicating how Aviva will prevent or minimise the potential of pit lake metal/metalloid biomagnification in fauna.* *Appendix G, Preliminary Closure Plan, Section 5.2.2. (page 5-2) states that "water quality in the final pit void may be affected by acid mine drainage" and Section 3.2.4 states that "The concentration of soluble metals and salts in runoff and seepage is generally likely to remain within the applied water quality guideline criteria, provided these materials do not undergo further oxidation, given their PAF classification".* *Recommendation 7: Aviva need to indicate how they will deal with post-closure acid mine drainage and potentially unacceptable high levels of soluble metals and salts from continued oxidation in the final pit lake system."*
Response	Water quality characteristics of the solute/leachate The current proposal includes the co-disposal of coal combustion ash with the mine waste rock below the water table and the co-disposal of saline residue from the Coolimba power station with the mine waste rock above the water table. This combination of co-disposal in the mine backfill results in a backfilled mine and a final void that will largely capture the solute created from groundwater reacting with the mine waste and coal combustion ash. The void has been modeled to be a localised groundwater sink capturing the solute that has been modeled to travel closely in line with the mine backfill path. Modeling of the concentrations of dissolved metals in the leachate indicates that these may exceed guideline values applied to various end users but importantly "salinity and metal concentrations of the leachate from the waste rock and coal combustion ash are much lower than the baseline groundwater." (refer to PER Appendix U – Predicted Impacts of Co-Disposal Options on Groundwater PER Section 6.2). What this means is that the leachate from the mine waste rock and coal combustion ash has no higher concentrations of these metals than the existing

groundwater. This also means that the void, though ending up with concentrations of metals, is unlikely to have a concentration that is any greater than any natural surface lake that takes the majority of its inflows from the local groundwater.

The Project therefore contends that the impacts to the fauna from the water quality of the void will be no more than the impacts to fauna from any other naturally occurring groundwater fed lake in this area.

The Project will fence the void (if required) to restrict the access of large terrestrial fauna. The Project will shape the banks such that any fauna that does enter the void is able to exit the void.

Acid Mine Drainage
Appendix G, Preliminary Closure Plan, Section 5.2.2. (page 5-2) states that "water quality in the final pit void may be affected by acid mine drainage…". Section 8.3 of the PER summarises the possible sources of AMD and concludes that the two sources are coal rejects and coal combustion ash.

The project does not envisage significant (if any) coal rejects and assumes that any coal rejects will be handled as potentially acid forming (PAF) to reduce the potential to form acid and therefore will not create an AMD issue. The reference made above to Section 3.2.4 in the Preliminary Closure Plan "The concentration of soluble metals and salts in runoff and seepage is generally likely to remain within the applied water quality guideline criteria, provided these materials do not undergo further oxidation, given their PAF classification" relates to the potential coal rejects (refer Preliminary Closure Plan – Appendix G Section 3.2.4), and therefore, due to the Project's intention to handle this material as PAF, this material is unlikely to give rise to an AMD issue in the final void.

With regard to the coal combustion ash, PER Section 8.3.2 states that the "coal combustion ash is unlikely to be a contributor to AMD". Ash samples from pilot scale test work were tested and shown to be non acid forming (NAF).

5.8. Dieback

Issue 5.8.1	*"There is a significant risk of the spread of Phytophthora dieback and weeds resulting from mining related activities including disturbances to surface water flow regimes, land clearing and traffic movement."* *Raised by the Department of Environment and Conservation*
Response	CWC does not agree that there is a significant risk of the spread of *Phytophthora* dieback and weeds. This position is based on the assessment of the existing environment and the range of management activities available to assist in the management of the spread of Phytophthora dieback and weeds in the project. These matters are discussed in the PER in Section 4.7 and Section 7.5. and in the EMP. In summary: • There is no evidence of dieback in previously undisturbed areas (there is some

evidence in previously disturbed areas around the Eneabba West Mineral sands mine – now closed).

- The annual rainfall in the area is only marginally conducive to the survival of *P. cinnamomi*.
- It would therefore be expected that the disease expression throughout the majority of the project area would be episodic rather than progressive disease expression that is seen in areas of higher rainfall.
- The spread of *P. cinnamomi* and other phytopthora species will be minimised through appropriate hygiene management measures including:
    - All vehicles and mobile plant entering the project area will be free of soil, gravel and plant material.
    - Any contaminated vehicles and mobile plant will be cleaned at a hygiene point to be positioned at the project area entrance.
    - Any fill required will be sourced from dieback disease free areas and transported in cleaned vehicles.
    - Dieback assessments will continue to be undertaken throughout the life of the Project.
    - The DEC *Phytophthora cinnamomi* Management Guidelines will be adopted as part of the dieback management strategies in the draft EMP.
    - Access to non-essential tracks will be discouraged by signs and/or physical barriers.
    - Access to nature reserves will be prohibited, except for any requirements to undertake monitoring, where prior approval from the DEC will be sought.
    - Any tracks used within the project area will be well drained with culverts installed to prevent any water flow across the road from adjacent disease infested vegetation. If this is not possible, roads will be closed in moist-soil conditions, or wash-down facilities will be installed on both sides of the affected road surface.
    - The on-site induction will advise contractors and employees of the current dieback mitigation processes.
    - CWC will liaise with Iluka regarding management measures and any known local infestations.

5.9. Visual amenity

Issue 5.9.1	*"The proposal does not address impacts on landscape and visual amenity."* *Raised by the Department of Environment and Conservation*
Response	Section 4.19 of the PER details the existing environment with regard to visual impacts and Section 9.3 of the PER makes an assessment of the visual amenity of the Project area and the impact of the project on the landscape from a visual perspective. The assessment was conducted in accordance with EIA Guidance Statement 33. The PER deals with the visual impacts on transient (people moving through the area) and stationary receptors (residents living in the area) and discusses the impacts for both the CWC and the Coolimba Projects. The assessment concludes that: • Due to the size of the power station stack and buildings and the mine waste dump, there will be varying degrees of visibility of the Projects from transient

and stationary receptors.

- Transient receptors will be affected for short periods only as they approach the site and given its short duration the impact is not considered significant.

- Although affected views for stationary receptors such as nearby residences have not been categorically quantified, it is acknowledged that those closest to the site are likely to experience the greatest change in views.

- Therefore, the additional management measures proposed here focus on reducing changes in views to residential properties. Appropriate measures include:

    - Directional lighting has been included to limit the impact of night time views.

    - Planting of suitable screening vegetation at identified properties that will experience uninterrupted views of the visible features.

    - Consideration will be given the colour of building cladding to minimise contrasts with backgrounds.

In summary, while the projects will have a visual impact it is considered that this impact is not such as to make the project environmentally unacceptable.

Management of the projects will enable the visual impacts to be reduced and the remaining impacts are not inconsistent with development along the Brand Highway in the vicinity of the project.

5.10. Offsets

Issue 5.10.1	*"DEC will not be in a position to endorse strategies for offsetting impacts given impact on critical assets until the level of significance of the impacts is adequately determined and the EPA has formed a view on the environmental acceptability of the project."* *Raised by the Department of Environment and Conservation* *"Aviva's offset position has not been clearly described or assessed."* *Raised by the Department of Environment and Conservation – Midwest Region*
Response	Both CWC and Coolimba have committed to the following specific offsets. • An offset for the loss of 861ha of vegetation clearing – CWC • An offset for any clearing in the SENR - Coolimba • An offset for any clearing of DRF – Coolimba & CWC Each of these offsets are subject to discussion with the DEC. The DEC have advised that they cannot assess the suitability of any offset until the "EPA has formed a view of the environmental acceptability of the project". CWC will re-engage with the DEC to determine the appropriate offsets when the environmental acceptability of the project has been determined.

Issue 5.10.2	*"A 4:1 offset for disturbed vegetation should be considered incorporating rehabilitation of nearby cleared areas adjacent to the reserve."* *Raised by Public Submission #1*
Response	CWC has committed to an offset of 1:1 plus rehabilitation of cleared areas. The DEC have advised that they cannot assess the suitability of any offset until the "EPA has formed a view of the environmental acceptability of the project". CWC will re-engage with the DEC to determine the appropriate offsets when the environmental acceptability of the project has been determined.

6. RESPONSE TO POLLUTION ISSUES RAISED IN SUBMISSIONS

6.1. Air Emissions

Issue 6.1.1	*The Proponent should ensure that dust management and monitoring plans are implemented in a timely fashion and comply with DEC requirements.* *Strategies should include providing feedback to DOH and include DOH in the processes to respond to breaches.* *Dust exceedances at nearby receptors remain a concern with both projects. The proponent should ensure that the proposed dust management and monitoring plans are implemented in a timely fashion and comply with DEC reporting requirements. It would be appropriate for DEC to develop strategies which can provide feedback to DOH on the implementation of the Dust Management Plan and should circumstances arise where health standards may be breached, to include DOH in response processes.* *Raised by the Department of Health*
Response	CWC will ensure that the dust management and monitoring plans are implemented in a timely fashion and comply with DEC reporting requirements. CWC will liaise with the DEC to develop strategies to provide feedback to DOH on the implementation of the Dust Management Plan especially dealing with potential events where health standards may be breached. The Dust Management Plan will include the DOH in the event response process.
Issue 6.1.2	*"The modelling within the PER indicates that there is potential for the mine to contribute to exceedences of the NEPM PM10 24 hour criteria of 50 µg/m3 and the Kwinana EPP 24 hour average TSP criteria of 90 µg/m3; however, the 150 µg/m3 24 hour average limit for TSP is unlikely to be exceeded. There are a number of factors that, in combination, result in uncertainty in the modeled concentrations and it is important to not place too much reliance on the absolute value of modelled particulate concentrations; however, in the absence of this certainty it becomes increasingly important to emphasise that the proponent needs to develop a comprehensive dust management system which involves validation of dust emission rates as well as the installation of an appropriate dust monitoring and dust control systems."* *Raised by the Department of Environment and Conservation – Air Quality Management Branch*
Response	CWC will develop a comprehensive dust management system which involves validation of dust emission rates as well as the installation of an appropriate dust monitoring and dust control systems. Further CWC will ensure that the dust management and monitoring plans are implemented in a timely fashion and comply with DEC reporting requirements.

Issue 6.1.3	*"Emissions data: while we do not ordinarily comment on or attempt to verify emissions data, it is important to recognise that the NPI emissions factors used in the modeling have significant limitations and cannot be guaranteed to be conservative. It is therefore recommended that a program of source emissions and modeling verification work is undertaken on commissioning of the mine to confirm that the current modeling is conservative."* *Raised by the Department of Environment and Conservation – Air Quality Management Branch*
Response	CWC will undertake a program of source emissions and modelling verification work on commissioning of the mine to confirm that the current modelling is accurate. Where variations to the Dust Management Plan are required to accommodate changes in the modelling these will be completed compliance with DEC requirements.
Issue 6.1.4	*"It is not clear from the PER on what basis the background PM I0 level of 30 µg/m3 was selected; this level is reasonably high however and should be conservative."* *Raised by the Department of Environment and Conservation – Air Quality Management Branch*
Response	The background level of 30 µg/m3 was based on the reported levels from recording done by Iluka at the Eneabba monitoring location. Reported dust monitoring was generally less than 30 so a conservative level of 30 µg/m3 was chosen.
Issue 6.1.5	*"Rainfall is one of the parameters that is used to estimate dust emission; but is not clear from the PER whether observed or modelled rainfall was used in emissions estimations."* *Raised by the Department of Environment and Conservation – Air Quality Management Branch*
Response	Appendix B the Air Quality Report (Appendix Q in the CWC PER) details that the rainfall information that was used in the emissions estimation was based on average for measurements from Eneabba for 2006 and 2007 that were collected by Iluka Resources.
Issue 6.1.6	*The township of Leeman is situated directly due west of the minesite and power station and would be directly in line for plumes and dust from the mine and the power station when the east winds blow.* *Raised by Public submission #2*
Response	The air quality model suggests that there will be no impacts as far away as Leeman.

Issue 6.1.7	*Despite the information from CWC regarding the 1.72% sulphur content of the coal, the fact remains that 64% of that sulphur is organic and unable to be cleaned. Coal Laboratories figures acknowledge that Cattamarra coal is twice as dirty as Collie coal to burn because of its organic sulphur content.* *What method of desulphurisation will be implemented?* *Will the organic sulphur residue be consigned to the ash pits?* *Raised by Public submission #2*
Response	*Desulphurisation* will occur in the Coolimba Power Station boilers via the addition of lime and the reporting of sulphur to the ash waste. The waste will then be disposed of in the backfill operation of the mine with other mine overburden. All sulphur residues will be treated in the same way.

6.2. Health Risk Assessment

Issue 6.2.1	*It is expected that any treatment and application of pesticides must be applied in accordance with the Health (Pesticides) Regulations 1956.* *Raised by the Department of Health*
Response	Any treatment and application of pesticides will be applied in accordance with the Health (Pesticides) Regulations 1956.

6.3. Noise

Issue 6.3.1	*"The precise noise data for the equipment to be used in the proposed mine site was not available. There was no guarantee that the noise levels of the equipment to be used in the proposed mining site would be no higher than those used in the noise modeling. In addition, the detailed design and assessment of several noise control measures proposed to reduce the noise emissions of major noise sources was not available and the efficiency and practicability of these proposed noise control measures were not demonstrated."* *"A change in the PER is required to confirm that unless the noise assigned levels can be met, the construction work outside daylight hours needs to seek the approval from the DEC Noise Branch CEO."* *Raised by the Department of Environment and Conservation*
Response	The Project confirms its commitments 11 and 12 (shown in section 2.3 above) and advises that In the event that construction work is required outside daylight hours then: • The construction work will be carried out in accordance with control of noise practices set out in Section 6 of Australian Standard 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition

Sites: and

- The equipment used for the construction is the quietest reasonably available.

Furthermore, if noise emissions are likely to exceed the assigned noise levels then:

- The contractor will advise all nearby occupants or other sensitive receptors who are likely to receive noise levels which fail to comply with the standard under Regulation 7, of the work to be done at least 24 hours before it commences;
- The contractor will show that it was reasonably necessary for the work to be done out of hours; and
- The contractor will prepare a noise management plan at least seven days before the work starts. The plan will include details of:
    - Need for the work to be done out of hours.
    - Types of activities which could be noisy.
    - Predictions of the noise levels.
    - Control measures for noise and vibration.
    - Procedures to be adopted for monitoring noise emissions.
    - Complaint response procedures to be adopted.

6.4. Water Quality

Issue 6.4.1	*Potential exists for groundwater contamination by leaching of mine backfill, ash and power station residues to be disposed within the mine void.* *Raised by the Department of Environment and Conservation*
Response	The potential for contamination of groundwater arising from co-disposal of mine waste rock, ash and saline solids from the Coolimba Power Station has been investigated with information presented in Section s 8.2 and 83 of the PER. Coal, overburden, interburden, potential coal rejects, and ash from coal combustion have been geochemically characterised to assess their potential for acid generation, and the composition of potential leachate. This testwork indicates that waste rock (overburden and interburden), which will comprise more than 90% of mine backfill, is considered having a low risk of acid formation given its very low total oxidisable sulphur content (TOS), with an average of samples tested 0.23%S, and median 0.07%S. More than 80% of samples tested were classified as non acid forming (NAF), 8% as 'uncertain-NAF', and the remaining 10% potentially acid forming (PAF). A further approximately 5% of backfill is ash which is indicated to have a negligible risk of acid generation due to its very low oxidisable sulphur content (<0.1%S),

classified NAF.

These results indicate that no special measures to encapsulate PAF components of waste rock, or ash in the mine backfill are likely to be necessary, nor that special consideration of whether placement of PAF components of waste rock in mine backfill above or below the water table is likely to be important.

The remaining less than 5% of mine backfill will be coal lost to dilution during mining, minor coal seams, and coal rejects, all of which are shown to have potential for acid generation, principally because of their higher oxidisable sulphur contents, and the limited acid neutralising capacity (ANC) of the bulk of the waste rock to counter this.

The CWC project will not wash coal so coal washing plant reject (potential coal reject) is not an issue. However other materials, classified as potential coal rejects, principally carbonaceous material found near the roof and floor of the main coal seams, any coal lost as dilution during mining, and minor seams not economic to mine as coal, will require consideration in terms of their disposal due to their potential to yield acid if they were to oxidise.

Coal is classified as PAF, principally on account of its total oxidisable sulphur content (median of samples 1.4%S), indicating that special consideration will need to be given to the handling and storage of coal to contain and manage potential acid leachate.

CWC will conduct further testwork to confirm the geochemical characteristics of coal, waste rock, and ash and will develop appropriate management strategies to manage any residual risks, in particular with respect to acid generation.

The potential for leaching of salts and metals from mine backfill components (waste rock, ash, and saline solids) by groundwater has also been assessed.

This testwork indicates that waste rock leachate will be pH-neutral and low to moderately saline. Metals concentrations in waste rock leachate are likely to be well within the applicable water quality guideline criteria and unlikely to present any environmental risks for on-site or down-stream water quality.

Leachate from coal and coal rejects is likely to be weakly acidic and moderately saline. Metal concentrations in leachate are likely to remain within applicable water quality guideline criteria, provided these materials do not undergo further oxidation.

CWC will conduct further testwork to establish the level of reactivity of potential coal reject material, and if indicated will develop mining protocols to manage these materials appropriately. Suitable strategies could include directing more of the potential reject material to product (for combustion), placement in preferred horizons in the backfill, including above or below the water-table, and encapsulation.

Leachate from ash is likely to be mildly alkaline and of low salinity. Metal concentrations of some metals, including As, B, Cr, Cu, Mo, Se and Zn, may be above applicable freshwater quality guideline criteria but within ANZECC (2000a, 2000b) guideline values for marine quality water.

Radionuclide concentrations are very low indicating that radioactivity associated with coal combustion ash (and coal) is expected to be within the background levels

for soil.

A solute transport model was used to predict groundwater quality during mining and after closure. The modelling shows that groundwater quality is unlikely to be affected by mining operations, including waste rock backfill, and co-disposal of ash and saline solids from the power station.

The leachate plume arising from leaching of waste rock, ash and saline solids returned to the mine is expected to remain approximately confined to the backfilled pit and will report to the final void lake which will behave as a local ground water sink due to evaporation and consequently will receive salts and dissolved metals from the local groundwater flow including the salts and metals contained in the leachate plume originating in mine backfill.

Salinity and metal concentrations in local groundwater during mining and after closure are expected to remain very close to pre-mining levels however, the concentration of salts in the final pit void will increase over time, to 100,000 mg/l (NaCl dominant) after ~500 years and ultimately to saturation over a much longer period. This change will occur very slowly and is consequently unlikely to have adverse impacts on local fauna which will avoid the increasingly saline conditions.

The increasing salt and metal concentration in the final pit void is expected to have negligible impact on local groundwater quality because groundwater flows in the immediate vicinity will be toward and into the void.

The water level in the final pit void is expected to stabilise within 4m of the original water table and the residual drawdown cone is expected to stabilise within 60 years of mine closure.

CWC will monitor and report groundwater quality during the mine life to confirm understanding of groundwater movement and quality issues.

Issue 6.4.2	*"Results from static testing (acid-base accounting) are inadequate to determine the long term potential risk of AMD to the receiving environment."* *Raised by the Department of Environment and Conservation - Midwest*
Response	The potential for contamination of groundwater arising from co-disposal of mine waste rock, ash and saline solids from the Coolimba Power Station has been investigated. All potential forms of disturbed material including coal, overburden, interburden, potential coal rejects, and ash from coal combustion have been geochemically characterised to assess their potential for acid generation and the composition of potential leachate. This testwork indicates that waste rock (overburden and interburden), which will comprise more than 90% of mine backfill, is considered having a low risk of acid formation given its very low total oxidisable sulphur content (TOS), with an average of samples tested 0.23%S, and median 0.07%S. More than 80% of samples tested were classified as non acid forming (NAF), 8% as 'uncertain-NAF', and the remaining 10% as potentially acid forming (PAF). A further approximately 5% of backfill is ash which is indicated to have a negligible

risk of acid generation due to its very low oxidisable sulphur content (<0.1%S), and is classified NAF.

These results indicate that no special measures to encapsulate NAF components of waste rock, or ash in the mine backfill are likely to be necessary, nor that special consideration of whether placement of NAF components of waste rock in mine backfill above or below the water table is likely to be important.

The remaining less than 5% of mine backfill will be coal lost to dilution during mining, minor coal seams, and coal rejects, all of which are shown to have potential for acid generation, principally because of their higher oxidisable sulphur contents, and the limited acid neutralising capacity (ANC) of the bulk of the waste rock to counter this.

The CWC project will not wash coal so coal washing plant reject (potential coal reject) is not an issue. However other materials, classified as potential coal rejects, principally carbonaceous material found near the roof and floor of the main coal seams, any coal lost as dilution during mining, and minor seams not economic to mine as coal, will require consideration in terms of their disposal due to their potential to yield acid if they were to oxidise.

Coal is classified as PAF, principally on account of its total oxidisable sulphur content (median of samples 1.4%S), indicating that special consideration will need to be given to the handling and storage of coal to contain and manage potential acid leachate.

CWC will conduct further testwork to confirm the geochemical characteristics of coal, waste rock, and ash and will develop appropriate management strategies to manage any residual risks, in particular with respect to acid generation.

CWC acknowledges the comments of the DEC and restates Commitment 10 to conduct further testing to confirm the AMD potential and refine the management strategies to address any potential impacts if required.

As part of this commitment and in keeping with the recommendations of the DEC the following specific matters will be detailed in the management strategies prior to the presentation of a Mining Proposal to the DMP:

- Additional testing will be completed prior to mining commencing to determine the geochemistry of the range of mineral waste materials and specifically the long term risk of acid production.
- The potential AMD risk will be fully evaluated prior to mining in order to adequately predict all potential impacts to surface water, groundwater and associated natural systems.
- AMD testing will continue throughout the Project.
- Results from the ongoing testing will be used to re-evaluate the mine's management strategies relating to mineral waste materials on an ongoing basis.
- Additional testing to incorporate material from the area to the north of the proposed mine zone will be completed at least 5 years prior to mining in this area. This will include an assessment of the direct or indirect impact on the environmental and conservation values of the Rocky Springs TEC or Lake Logue Nature Reserve.
- Monitoring of outcomes and revision of practices where necessary.

Issue 6.4.3	*How much acid is involved here? What is the definition of AMD?* *Raised by Public Submission #2*
Response	AMD stands for Acid Mine Drainage. The key issue in regard to AMD is environmental contamination as a result of acid formation by materials which are susceptible to oxidation and leaching. The issue with regard to the CWC project is whether the proposal has the potential to create AMD and its impact on the environment. Studies conducted by CWC found that over 80% of waste rock may be classified Non Acid Forming (NAF), and a further 8% uncertain non acid forming (UC-NAF). These materials are unlikely to generate acid when placed in waste dumps or as backfill, regardless of the presence of water or oxygen. The remaining approximately 10% of materials may be classified as potentially acid forming (PAF) and potentially acid forming low capacity (PAF-LC), requiring that consideration needs to be given to how and where they are placed if their acid generating potential is to be negated. Analysis was given to the types of materials (within the 10% of PAF materials) and how they might be managed. Management plans were developed to address with each type of material and CWC has committed (Commitment 10) to further testing of the AMD potential of all materials as part of detailed mine design and mine operation.

7. RESPONSE TO SOCIAL ISSUES RAISED IN SUBMISSIONS

7.1. Community and Social Effects

Issue 7.1.1	*"The development is proposed in a region where mosquito-borne disease is not generally a major concern. However, under certain environmental conditions the region can experience problems, with nuisance mosquitoes and cases of Ross River virus have been reported."* *Raised by the Department of Health*
Response	CWC agrees that mosquito-borne disease is not generally a major concern in the area of the Project. CWC will continue to monitor the environmental conditions and work with the Department of Health to development management plans should it be determined that plans are required.
Issue 7.1.2	*Set up a social impact unit to consider and manage issues in consultation with communities.* *Raised by Public submission #2*
Response	Commitment 13 in the PER (refer Section 2.3 above) states that Coolimba will work with the relevant stakeholders to leave a positive legacy in the community. CWC will work with the Shires of Carnamah and Coorow to manage community issues related to the construction and operation of the projects. CWC will discuss with the shires the best way of addressing community issues, which may include for example, a community reference group, regular newsletters and a web based communication forum.

7.2. Temporary Camp Site

Issue 7.2.1	*"It is however essential that the proponent works closely with Council and the Community in relation to the temporary camp site."* *Raised by the Shire of Coorow*
Response	The preferred accommodation option will be largely determined by negotiation with the local shires to determine the best way to achieve Commitment 13 of the PER which is to leave a positive legacy for the community within the region. The location of the camp has been and continues to be openly discussed with the Shire of Coorow. The site is expected to contain the accommodation, amenities and vehicle parking. The camp will provide for a capacity of 600 construction workers for both the power station and mine. Appropriate approvals for the accommodation camp will be sought at the appropriate time.

The camp is being designed so that it forms a beneficial feature for the Shire to use once the construction phase is complete.

7.3. Traffic and Transport

Issue 7.3.1	*"The Shire of Coorow would like a commitment that the proponents would assist Council in lifting the quality of these roads to a bitumen standard as the road would not require upgrading with out the expected level of traffic movements"* *Raised by the Shire of Coorow*
Response	Section 9.2.3 details the required management activities for the transport links. CWC will discuss the requirement with the relevant authorities and offer assistance.

7.4. Aboriginal Heritage

Issue 7.4.1	*"… locations, which have been identified as significant to the Aboriginal community in the report, need to be submitted on site forms and sent to the Registrar of Sites in DIA."* *Raised by the Department of Indigenous Affairs*
Response	Portions of the CWC Project area have been surveyed by consultants representing the relevant claimant groups. There was one site and several items found of Aboriginal significance in the area. Appropriate reporting of these sites is under way. Heritage surveys will be conducted of all remaining proposed areas of disturbance well prior to disturbance and reports of those surveys made available to the claimant groups and the DIA. If required, CWC will seek section 18 clearances for any confirmed sites. Commitment 15 in the PER addresses this issue.
Issue 7.4.2	*Additional consultation with Franks and Amangu native title claimants.* *Raised by the Department of Indigenous Affairs*
Response	CWC will continue to consult with the claimant groups throughout the remaining survey period, the operational life of the project and the closure of the mine. Full consultation including heritage surveys will occur prior to ground disturbance activities.
Issue 7.4.3	*Should cultural material be discovered during the project, work should cease immediately and the site should be recorded and the DIA notified.* *Raised by the Department of Indigenous Affairs*
Response	As outlined in the PER at Section 9.4 the proponent will prepare a management

plan in consultation with the DIA and Native Title Claimant Groups to deal with any requirements for cultural material discovered during the project.

- Should cultural material be discovered during the project, work in areas that directly impact the location of that material will cease immediately and the site will be recorded and the DIA notified.
- If the site is confirmed to be a site then a section 18 notice will be sought.
- CWC will follow the requirements of Heritage Act.

Issue 7.4.4	*"Workers should be made aware of obligations under Aboriginal Heritage Act"* *Raised by the Department of Indigenous Affairs*
Response	All employees and contractors will be made aware of the obligations under the Aboriginal Heritage Act as part of the site induction process.

8. REFERENCES

Aviva/URS (2009a)
Central West Coal Mine Project – Public Environmental Review. Accessed from : http://avivacorp.com.au/?id=151

Aviva/URS (2009b)
Coolimba Power Project – Public Environmental Review. Accessed from : http://www.coolimbapower.com.au/environment/per.html

Beard, J.S. (1979)
The vegetation of Dongara, Western Australia. Map and explanatory memoir. 1:250 000 series. Vegmap Publications. Perth

Brown A. Thomson-Dans C., Marchant N. eds (1998)
Western Australia's Threatened Flora Department of Conservation and Land Management, Como, Western Australia

Brown A., Dundas P., Dixon K., and Hopper S. (2008)
Orchids of Western Australia. University of Western Australia Press. Crawley, Western Australia.

Butcher R. (2007)
New taxa of 'leafless' Tetratheca (Elaeocarpaceae, formerly Tremandraceae) from Western Australia. Australian Systematic Botany. 20(2) 139–160.

Ecologia (2008a)
Aviva Corporation Ltd Central West Coal Project and Coolimba Power Station Project Vertebrate Fauna Survey, August 2008

Ecologia (2008b),
Aviva Corporation Ltd Central West Coal Project and Coolimba Power Station Project Short Range Endemic Survey and Literature Review, October 2008

Environmental Protection Authority (2004a)
EPA Position Statement No. 7 - Principles of Environmental Protection. August 2004

Environmental Protection Authority (2004b)
Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia. No. 51. June 2004.

Glevan Consulting (2007)
Coolimba Power Project. Central West Coal Project. Dieback Assessment. Unpublished report prepared for Aviva Resources Ltd.

Hamilton-Brown, S., Broun, G., and Rees, R (2004)
Interim Recovery Plant 154. Ferricrete floristic community (Rocky springs type). Interim Recovery Plan 2004-2009. Prepared by Department of Conservation and Land Management.

Mattiske Consulting Pty Ltd (2009)
Flora and Vegetation of the Aviva Lease Area. Report Prepared for Aviva Corporation.

Rockwater Pty Ltd (2008b)
Stygofauna Sampling for the Central West Coal Project. Unpublished report prepared for Aviva Corporation Ltd. June 2008.

Stack, G. and English, V. (2003).
Split-leaved Grevillea (Grevillea althoferorum) Interim Recovery Plan 2003-2008. Department of Conservation and Land Management, Wanneroo, WA.

Stack G. and Broun G.(2004)
Eneabba Mallee (Eucalyptus impensa) Interim Recovery Plan 2004-2009. Department of Conservation and Land Management, WA, 2004. Accessed from http://www.environment.gov.au/biodiversity/threatened/publications/recovery/e-impensa/pubs/eimpensa.pdf on 18 Feb 2009

Subterranean Ecology Scientific Environmental Services (2007)
Central West Coal Project & Coolimba Power Project Troglofauna Desktop Assessment. Unpublished report prepared for Aviva Corporation Ltd. November 2007.

Threatened Species Scientific Committee (2008a).
Commonwealth Conservation Advice on Eucalyptus crispata. [Online]. Department of the Environment, Water, Heritage and the Arts. http://www.environment.gov.au/biodiversity/threatened/species/pubs/24268-conservation-advice.pdf

Threatened Species Scientific Committee (2008b).
Commonwealth Conservation Advice on Eucalyptus johnsoniana. [Online]. Department of the Environment, Water, Heritage and the Arts. Accessed from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/14516-conservation-advice.pdf

West Australian Herbarium (2009)
Florabase – The Western Australian Flora. Department of Environment and Conservation. http://florabase.dec .wa.gov.au.

Woodman Environmental Consulting Pty Ltd (2001)
Flora and Vegetation Mapping – IPL South Vegetation Mapping. Unpublished report prepared for Iluka Resources Ltd – Iluka 00-16

Woodman Environmental Consulting Pty Ltd (2009)
Iluka Resources Ltd and Aviva Corporation Limited, “Further Survey for Gevillea Althoferorum Subsp Althoferorum”, July 2009

FIGURES

328,000 mE
330,000 mE
332,000 mE
334,000 mE
6,686,000 mN
6,684,000 mN
6,682,000 mN

N
W E
S
0 200 400 800
metres

Grevillea Althoferorum subsp althoferorum locations

CL Cleared paddocks and grassland

E3 Woodland and Open Woodland of Eucalyptus camaldulensis var. obtusa over Melaleuca viminea subsp. viminea, Acacia saligna, Melaleuca lateriflora subsp. acutifolia and Macrozamia fraseri on sandy loam.

E4 Open Low Woodland of Eucalyptus todtiana and Nuytsia floribunda over Banksia menziesii and Stirlingia latifolia on sandy drainage lines

E5 Open Low Woodland of Eucalyptus todtiana, Nuytsia floribunda over Banksia menziesii and Conospermum triplinervium on sandy uplands

E6 Open Low Woodland of Eucalyptus todtiana and Nuytsia floribunda over mixed low shrubs and herbs on sandy lowlands

H3 Heath or Scrub of Melaleuca leuropoma, Banksia sphaerocarpa var. sphaerocarpa, Dryandra nivea subsp. nivea, Eremaea beaufortioides var. lachnosanthe and Hibbertia subvaginata on lateritic rises

H4 Mixed Heath of Proteaceae and Myrtaceae spp. with occasional Eucalyptus todtiana on sand.

H5 Mixed Heath or Shrubland of Xanthorrhoea drummondii, Allocasuarina humilis and Hibbertia spp. and Proteaceae spp. on lateritic uplands

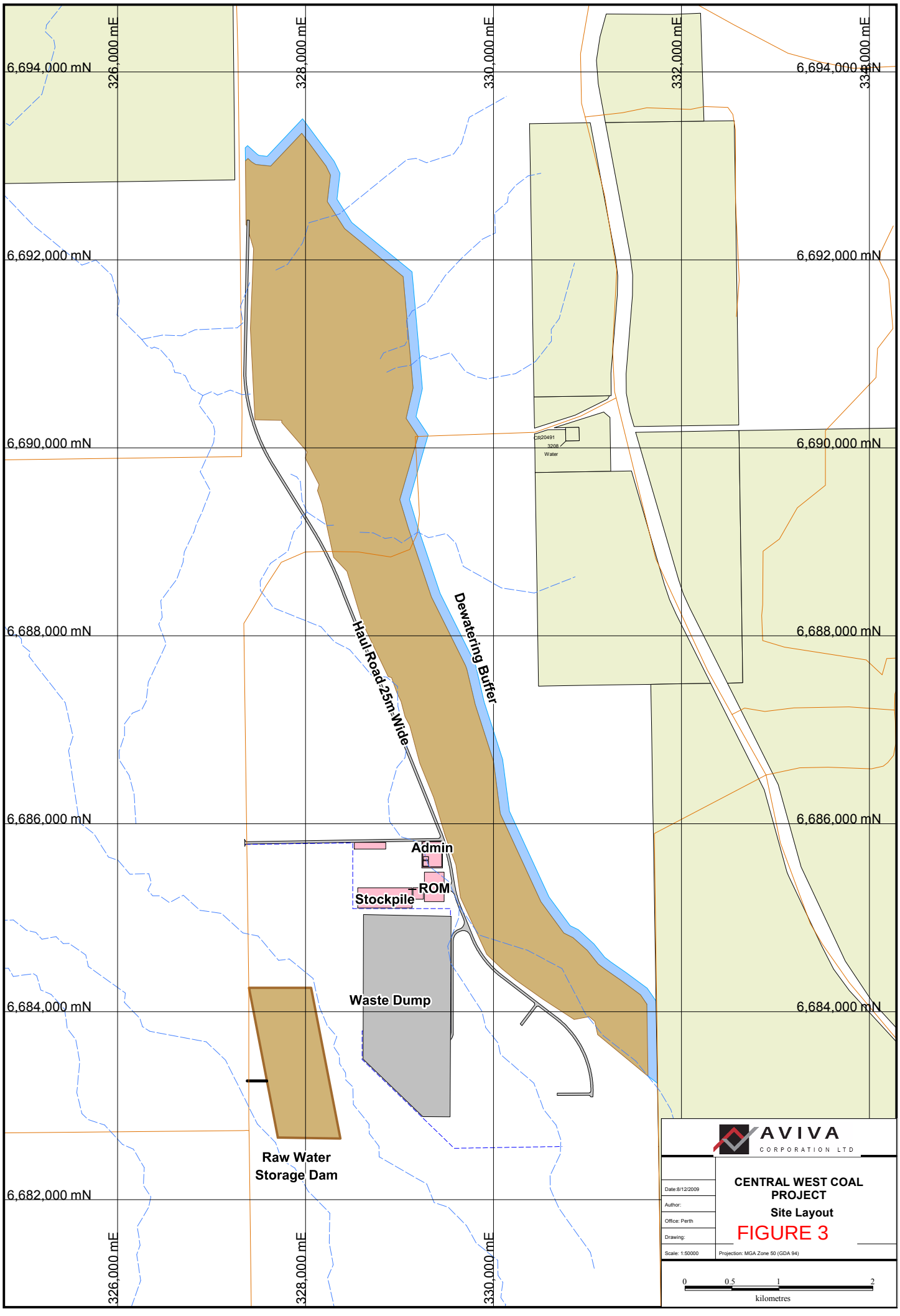
T1 Scrub or Thicket of Banksia attenuata, Banksia menziesii, Banksia sphaerocarpa var. sphaerocarpa, Adenanthos cygnorum subsp. cygnorum, Banksia hookeriana and Conospermum triplinervium on sand.

Mine Pit
Waste Dump
Southern Extension
South Eneabba Nature Reserve

AVIVA CORPORATION LTD
Central West Coal Project

Plant Communitites & Grevillea Althferorum subsp althferorum populations

FIGURE 2


6,694,000 mN
6,692,000 mN
6,690,000 mN
6,688,000 mN
6,686,000 mN
6,684,000 mN
6,682,000 mE
326,000 mE
328,000 mE
330,000 mE
332,000 mE
334,000 mE
CR20491
3208
Water
Haul Road 25m Wide
Dewatering Buffer
Admin
ROM
Stockpile
Waste Dump
Raw Water
Storage Dam
AVIVA
CORPORATION LTD
CENTRAL WEST COAL
PROJECT
Site Layout
FIGURE 3
Date:8/12/2009
Author:
Office: Perth
Drawing:
Scale: 1:50000
Projection: MGA Zone 50 (GDA 94)
0
0.5
1
2
kilometres