Environmental Assessment

Cadia East Project

SECTION 3

TABLE OF CONTENTS

LIST OF TABLES

3 PLANNING FRAMEWORK AND PROJECT JUSTIFICATION

This section outlines the statutory requirements relevant to the assessment of the Project. It also provides a discussion and justification for the Project on economic, social and environmental grounds when considered against the objects of the EP&A Act, including the principles of Ecologically Sustainable Development (ESD).

A Project Approval is sought which would consolidate the Development Consents for the existing approved Cadia Valley Operations mines (i.e. Ridgeway, Ridgeway Deeps and Cadia Hill) and the Blayney Dewatering Facility.

The Project Application would be assessed in accordance with the framework established by the EP&A Act and the EP&A Regulation. In addition, the Project has been declared a controlled action under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). The relevant framework for EPBC Act assessment of the Project under the bilateral agreement between NSW and the Commonwealth is described in Section 3.4 and Appendix C.

3.1 EXISTING APPROVALS AND REGULATORY CONTROLS

As described in Sections 1 and 2, CHPL's existing Cadia Valley Operations include open pit and underground mining operations, ore processing, concentrate transport and concentrate dewatering and train loading in Blayney. These activities are covered by various approvals and licences, key components of which are described below. A detailed register of current licences, permits and approvals is maintained by CHPL and a summary of it is presented annually in the Cadia Valley Operations Annual Environmental Management Report (AEMR).

Existing environmental management, monitoring and mitigation measures that are implemented within the Cadia Valley Operations approval framework are described, where relevant, in Section 4.

3.1.1 Cadia Hill Gold Mine

The potential environmental impacts of Cadia Hill were assessed in the Cadia Hill EIS (Newcrest, 1995). A separate application and EIS was prepared for the dewatering facility in Blayney (Section 3.1.2).

Following public exhibition of the Cadia Hill EIS and conduct of a Commission of Inquiry (COI), the NSW Minister for Urban Affairs and Planning approved Cadia Hill in September 1996 (DA 44/95).

After the issue of the Cadia Hill Development Consent (DA 44/95), a series of secondary approvals were obtained by CHPL. These included:

- ML 1405 issued by the NSW Department of Mineral Resources (DMR) (now the NSW Department of Primary Industries [DPI]) under the *Mining Act, 1992*;
- Environment Protection Licence (EPL) No. 5590 (originally a pollution control licence) issued by the NSW Environment Protection Authority (EPA) (now DECC) under the PoEO Act; and
- surface water extraction and groundwater bore licences issued by the NSW Department of Land and Water Conservation (DLWC) (now DWE) issued under the *Water Act, 1912*.

OCC provides treated water to the Cadia Valley Operations via a pipeline from the Orange Sewage Treatment Plant (Figure 1-1). The pipeline infrastructure is owned and operated by the OCC. On this basis it is not a component of the Project, and is not included in the Project Application.

BSC similarly provides treated water to the Cadia Valley Operations via a pipeline from the Blayney Sewage Treatment Plant to the Blayney Dewatering Facility (Section 2.1.10). The pipeline infrastructure is owned and operated by the BSC. On this basis it is not a component of the Project, and is not included in the Project Application.

Mining at Cadia Hill commenced in 1998.

Since the approval of Cadia Hill a number of modifications of the Development Consent (DA 44/95) have been assessed and approved (Table 3-1).

Table 3-1
Development Consent Modifications for the Cadia Valley Operations

Consent Modified	Name of Modification	Modification Code	Year Approved
DA 133-04-00	Concentrate Dewatering Facility Modification	133-04-00/M1	2001
DA 134-04-00	Ridgeway Rate Upgrade	134-04-00/M1	2002
DA 44/95	Cadia Extended	MOD–92-11-2002-i	2003
DA 44/95	Modification to North Waste Rock Dump approval	MOD 98-9-2003 I	2003
DA 44/95; DA 133-04-00; DA 134-04-00	Trucking of concentrate (Concentrate Road Transport)	MOD-Cadia-2004	2004
DA 44/95; DA 134-04-00	Expansion of South Waste Dump	-	2004
DA 133-04-00	Concentrate Dewatering Facility Loading Modification	MOD 2-1-2005	2005
DA 133-04-00	Concentrate Dewatering Facility Loading Modification	MOD 171-11-2005	2005
DA 44/95	Temporary access to Groundwater and Temporary Changes to Cadiangullong Dam Flow Release regime	-	2007
DA 44/95	Temporary access to Groundwater and Temporary Changes to Cadiangullong Dam Flow Release regime	-	2007
DA 134-04-00	Temporary Change to Helensholme Gauge condition	-	2007
DA 44/95; DA 134-04-00	Statement of Environmental Effects South Waste Rock Dump Modification	DA 44/95 MOD 7 134-04-00 MOD 6	2008
DA 134-04-00; DA 257-10-2004	Review of Environmental Factors – Ridgeway Deeps Secondary Crusher	134-04-00 MOD 7 DA 257-10-2004 MOD 1	2008
DA 44/95; DA 134-04-00; DA 257-10-2004	Water Efficiency Modification - Environmental Review	44/95 MOD 8 134-04-00 MOD 8 DA 257-10-2004 MOD 2	2008
DA 44/95; DA 134-04-00; DA 257-10-2004	Processing Rate Modification Environmental Review	44/95 MOD 9 134-04-00 MOD 9 DA 257-10-2004 MOD 3	2008

The consolidated Development Consent for Cadia Hill (i.e. incorporating the various modifications listed in Table 3-1) is available on the DoP website at:

http://www.planning.nsw.gov.au/asp/pdf/da_44_95_mod8_cadia_consolidconsent.pdf

A description of the approved operation of Cadia Hill is provided in Section 2.1.

3.1.2 Blayney Dewatering Facility

The potential impacts of the Blayney Dewatering Facility (that was developed in support of Cadia Hill) were assessed in the *Concentrate Dewatering Facility Environmental Impact Statement* (CHPL, 1997) (the Dewatering Facility EIS).

The facility was approved by the BSC in August 1997 (DA 1/97/98) and commenced operation in 1998.

The potential environmental impacts of a proposed expansion of the Blayney Dewatering Facility in support of Ridgeway (Section 3.1.3) were assessed via the *Blayney Concentrate Dewatering Facility Expansion Statement of Environmental Effects* (CHPL, 2000a). The expansion of the facility was approved by the NSW Minister for Urban Affairs and Planning in October 2000 and a new Development Consent was issued at that time (DA 133-04-00).

A number of subsequent modifications of the facility have been assessed and approved. These are summarised in Table 3-1.

The consolidated Development Consent for the Blayney Concentrate Dewatering Facility (referred to in this EA as the Blayney Dewatering Facility) (i.e. incorporating the various modifications listed in Table 3-1) is available on the DoP website at:

http://www.planning.nsw.gov.au/assessingdev/pdf/134-04-00_consolidated.pdf

A description of the approved operation of the Blayney Dewatering Facility is provided in Section 2.1.

3.1.3 Ridgeway Gold Mine

Following development of a Ridgeway exploration decline in accordance with DMR exploration approvals, the potential environmental impacts of a Ridgeway trial to extract a bulk ore sample and trial stoping mining methods at the Ridgeway orebody was assessed in the *Ridgeway Trial Statement of Environmental Effects* (Ridgeway Trial SEE) (CHPL, 1998).

The Ridgeway Trial was approved by the NSW Minister for Urban Affairs and Planning in 1999 and a new Development Consent was issued (DA 101-12-98). Subsequently, a new mining lease for the trial mine was issued by the DMR (ML 1449).

Following the successful completion of the Ridgeway Trial, the potential environmental impacts of Ridgeway were assessed in the Ridgeway EIS (CHPL, 2000b). After public exhibition of the Ridgeway EIS and conduct of a COI, the NSW Minister for Urban Affairs and Planning approved Ridgeway in October 2000 (DA 134-04-00).

Since the issue of the Ridgeway Development Consent (DA 134-04-00), a series of secondary approvals were obtained by CHPL. These included:

- ML 1472 and ML 1481 issued by the DMR;
- amendment of EPL No. 5590 issued by the EPA to include Ridgeway; and
- additional surface water extraction and groundwater bore licences issued by the DLWC.

Ridgeway commenced production in 2002.

A number of modifications of the Ridgeway Development Consent (DA 134-04-00) have been assessed and approved. A summary of the approved modifications is provided in Table 3-1.

The consolidated Development Consent for Ridgeway (i.e. incorporating the various modifications listed in Table 3-1) is available on the DoP website at:

http://www.planning.nsw.gov.au/asp/pdf/da_134_04_00_mod8_ridgeway_consolidconsent.pdf

A description of the approved operation of Ridgeway is provided in Section 2.1.

3.1.4 Ridgeway Deeps

After the approval and development of Ridgeway, CHPL exploration activities identified and delineated a significant extension of the Ridgeway orebody at depth below the approved mine that would significantly extend the life of Ridgeway. This area was named Ridgeway Deeps.

The potential cumulative environmental impacts of the development of Ridgeway Deeps were assessed in the *Ridgeway Deeps Statement of Environmental Effects* (CHPL, 2004a) (Ridgeway Deeps SEE). Following public exhibition of the Ridgeway Deeps SEE the NSW Minister for Infrastructure and Planning approved Ridgeway Deeps in 2005 (DA 257-10-2004).

Following the approval of Ridgeway Deeps, two modifications of the Ridgeway Deeps Development Consent (DA 257-10-2004) were assessed and approved. A summary of these modifications is provided in Table 3-1.

The consolidated Development Consent for Ridgeway Deeps (i.e. incorporating the various modifications listed in Table 3-1) is available on the DoP website at:

http://www.planning.nsw.gov.au/asp/pdf/da_257_10_2004_mod2_ridgeway_deeps_consolidconsent.pdf

A description of the approved operation of Ridgeway (incorporating Ridgeway Deeps) is provided in Section 2.1.

3.1.5 Cadia East Exploration

A series of exploration activities have been undertaken, and/or are currently occurring, at the Cadia East deposit. These activities have been assessed and approved by the DPI-MR in accordance with the requirements of Part 5 of the EP&A Act.

The relevant assessment documentation and a brief description of the key Cadia East exploration activities are provided below:

- *Cadia Valley Operations – Cadia East Underground Exploration and Decline Development Programme Review of Environmental Factors* (CHPL, 2004b) – comprising an underground exploration decline to access the Cadia East deposit (including surface works, collection of a bulk sample and underground exploration drilling).
- *Cadia East Underground Exploration Programme Extension Review of Environmental Factors* (CHPL, 2008d) – comprising an extension of the previously approved exploration decline and additional bulk sampling and exploration drilling.
- *Upper Cadia East and Cadia Hill Deeps Exploration Decline Review of Environmental Factors* (CHPL, 2008e) – comprising construction of a new underground exploration decline to access the upper portion of the Cadia East deposit and the lower portion of the Cadia Hill deposit (including surface works, bulk sampling and underground exploration drilling).

Existing Cadia East infrastructure that has been developed in accordance with these existing exploration approvals is described in Section 2.1.

3.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

3.2.1 Overview

As described in Section 1.1.1, this EA has been prepared to accompany the Project Application, in accordance with Part 3A of the EP&A Act.

The Project was determined to be a "Major Project" to which Part 3A of the EP&A Act applies in accordance with the Major Projects SEPP on 19 December 2006 by the Director-General of the DoP, as delegate of the NSW Minister for Planning.

Part 3A of the EP&A Act provides an approval process that is tailored to major projects.

Section 75B(1) of the EP&A Act defines projects to which Part 3A applies:

> *This Part applies to the carrying out of development that is declared under this section to be a project to which this Part applies:*
>
> *(a) by a State environmental planning policy, or*
>
> *(b) by order of the Minister published in the Gazette (including by an order that amends such a policy)…*

Schedule 1 of the Major Projects SEPP describes development that is declared to be a project to which Part 3A of the EP&A Act applies. The Project is considered to be a project to which Part 3A of the EP&A Act applies under Schedule 1, Group 2 (*Mining, petroleum production, extractive industries and related industries*) of the Major Projects SEPP.

Clause 5 of Schedule 1 (Group 2) provides:

> ***5 Mining***
>
> *(1) Development for the purpose of mining that:*
>
> *…*
>
> *(c) has a capital investment value of more than $30 million or employs 100 or more people.*

On 19 December 2006, the Director-General of the DoP, under delegation from the NSW Minister for Planning (the Minister), formed the opinion that the Project is of a kind that meets the description in the Major Projects SEPP (set out above), and pursuant to clause 6(1) of the Major Projects SEPP, declared the Project to be a project to which Part 3A of the EP&A Act applies. In accordance with section 75D(1) of the EP&A Act, the Minister is the approval authority for the Project.

3.2.2 Application of other Provisions of the Environmental Planning and Assessment Act, 1979

Section 75R of the EP&A Act outlines the applicability of other provisions of the EP&A Act relevant to the assessment and approval of a project under Part 3A:

- Parts 4 and 5 of the EP&A Act do not, except as provided by Part 3A, apply to a project approved under Part 3A, including the declaration of a project as a project to which Part 3A applies, and any approval or other requirement under Part 3A for the project.
- Part 3 of the EP&A Act and State Environmental Planning Policies (SEPPs) apply to the declaration of a project as a project to which Part 3A applies and the carrying out of a project to which Part 3A applies.
- Non-SEPP Environmental Planning Instruments (e.g. LEPs and Regional Environmental Plans) do not apply to a project approved under Part 3A.

Notwithstanding the above, under section 75J(3), the provisions of any environmental planning instruments that would ordinarily apply to the Project if it were not to be assessed under Part 3A, may be taken into account by the Minister in deciding whether or not to approve the carrying out of the Project.

Prior to 20 July 2007, section 75J(3) of the EP&A Act provided that the Minister was not precluded from granting Part 3A approval to a project unless it was "wholly prohibited" under an environmental planning instrument.

Section 75J(3) was amended on 20 July 2007 to provide:

> *In deciding whether or not to approve the carrying out of a project, the Minister may (but is not required to) take into account the provisions of any environmental planning instrument that would not (because of section 75R) apply to the project if approved. However, the regulations may preclude approval for the carrying out of a class of project (other than a critical infrastructure project) that such an instrument would otherwise prohibit.* [Emphasis added]

The savings and transitional provisions consequent upon the above amendment, provided that the amendment extends to matters pending under Part 3A on the commencement of the amendment (paragraph 108 of Schedule 6 to the EP&A Act).

Clauses 8N and 8O of the EP&A Regulation commenced on 20 July 2007. Those provisions preclude, in certain circumstances, the grant of approval under Part 3A for the carrying out of a project or part of a project that is prohibited by an environmental planning instrument. Clauses 8N and 8O relevantly provide:

> ***8N Projects or concept plans for which approval may not be given concerning environmentally sensitive land or sensitive coastal locations***
>
> *(1) For the purposes of sections 75J (3) and 75O (3) of the Act, approval for a project application may not be given under Part 3A of the Act for any project, or part of a project, that:*
>
> *(a) is located within an environmentally sensitive area of State significance or a sensitive coastal location, and*
>
> *(b) is prohibited by an environmental planning instrument that would not (because of section 75R of the Act) apply to the project if approved.*
>
> ***8O Other projects prohibited by environmental planning instruments for which project approval may not be given***
>
> *(1) For the purposes of section 75J (3) of the Act, approval for the carrying out of a project may not be given under Part 3A of the Act for any project, or part of a project, that:*
>
> *(a) is not the subject of an authorisation or requirement under section 75M of the Act to apply for approval of a concept plan, and*
>
> *(b) is prohibited by an environmental planning instrument that would not (because of section 75R of the Act) apply to the project if approved.*

Clause 8OA of the EP&A Regulation is a transitional provision, which provides as follows:

> ***8OA Transitional provision—projects or concept plans otherwise prohibited for which approval may be given***
>
> *Clauses 8N and 8O do not apply to a project application if, before the commencement of those clauses, the Director-General had notified the proponent of environmental assessment requirements under section 75F of the Act relating to the project, or part of the project, concerned.*

The Director-General notified CHPL of the environmental assessment requirements for the Project on 21 March 2007. As a result, clause 8OA of the EP&A Regulation is enlivened and clauses 8N and 8O do not apply to the Part 3A application for the Project. This is the case, notwithstanding that the Director-General notified CHPL of revised environmental assessment requirements on 5 November 2008.

Divisions 6 (Contributions) and 6A (Affordable Housing Contributions) of Part 4 of the EP&A Act also apply to a project to which Part 3A applies.

3.2.3 Other Approvals and Legislation that must be Applied Consistently to Part 3A Projects

Section 75V(1) of the EP&A Act outlines the authorisations that cannot be refused if they are necessary for the carrying out of a project approved under Part 3A and those authorisations must be substantially consistent with the Part 3A approval.

These authorisations are those required under the following legislative provisions:

- section 144 of the *Fisheries Management Act, 1994* (FM Act);
- section 15 of the *Mine Subsidence Compensation Act, 1961*;
- mining lease under the *Mining Act, 1992*;
- production lease under the *Petroleum (Onshore) Act, 1991*;
- EPL under Chapter 3 of the PoEO Act;
- section 138 of the *Roads Act, 1993*; and
- a licence under the *Pipelines Act, 1967.*

3.2.4 Other Approvals and Legislation that do not apply to Approved Part 3A Projects

Sections 75U(1) and (2) of the EP&A Act outline the authorisations that are not required for a project approved under Part 3A. These authorisations are those ordinarily required under the following legislative provisions:

- Part 3 of the *Coastal Protection Act, 1979*;
- sections 201, 205 and 219 of the FM Act;
- Division 8 of Part 6, Part 4 and section 139 of the *Heritage Act, 1977*;
- sections 87 and 90 of the *National Parks and Wildlife Act, 1974*;
- section 12 of the *Native Vegetation Act, 2003;*
- Part 3A of the *Rivers and Foreshores Improvement Act, 1948*;
- section 100B of the *Rural Fires Act, 1997*; and
- sections 89, 90 and 91 of the *Water Management Act, 2000*.

3.3 OTHER APPLICABLE PLANNING INSTRUMENTS AND STATUTORY APPROVALS

3.3.1 Other Planning Instruments

The Project Application area falls within two LGAs (i.e. Blayney and Cabonne) (Figure 1-5). The boundary between the Blayney and Cabonne Shires runs approximately east-west between the Cadia East deposit and the Ridgeway deposit (Figure 1-5). Both the Blayney and Cabonne LEPs are relevant to the Project.

The Orange LGA is located to the north of the Project (Figure 1-5). Whilst the Project area does not occur within the Orange LGA, it is of relevance to the Project as the majority of mine employees live in Orange.

Part 4 of the EP&A Act does not apply to a project approved under Part 3A of the EP&A Act (including the declaration of a project as a project to which Part 3A applies, and any approval or other requirement under Part 3A for the project) (Section 3.2.2). Accordingly, references throughout the Cabonne and Blayney LEPs to "consent authority" for the purposes of assessment of development under Part 4 of the EP&A Act are not applicable to a project to which Part 3A applies.

However, certain clauses of the Cabonne and Blayney LEPs that would ordinarily be applicable but for the Project being assessed under Part 3A, may be taken into account by the Minister in deciding whether or not to approve the carrying out of the Project (Section 3.2.2). These are described in Attachment 3.

3.3.2 Other Statutory Approvals

The following Acts may be applicable to the Project:

- *Contaminated Lands Management Act, 1997;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Noxious Weeds Act, 1993;*
- *Rail Safety Act, 2002;*
- *Dangerous Goods (Road and Rail Transport) Act, 2008;*
- *Roads Act, 1993;*
- *Protection of the Environment Operations Act, 1997;*

- *Threatened Species Conservation Act, 1995;*
- *Mining Act, 1992;*
- *Occupational Health and Safety Act, 2000;*
- *Dams Safety Act, 1978;*
- *Crown Lands Act, 1989;*
- *Local Government Act, 1993;* and
- *Pipelines Act, 1967.*

Applications for licences and permits required under these Acts which are relevant to the Project would be submitted to the relevant government agencies as required.

Additional detail on the likely requirements under the *Mining Act, 1992* is provided in the sub-section below.

The Commonwealth EPBC Act is also applicable to the Project as described in Section 3.4 and Appendix C.

The Commonwealth *National Greenhouse and Energy Reporting Act, 2007* (NGER Act) would also be applicable to the Project.

3.3.3 Mining Act, 1992

Under the *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions included in all mining leases, including requirements for the submission of a MOP prior to the commencement of operation, and subsequent AEMR.

Collectively, the MOP and AEMR constitute the *Guidelines to the Mining, Rehabilitation and Environmental Management Process* (MREMP Guidelines) (DPI-MR, 2006) which has been developed by DPI-MR.

The Mining, Rehabilitation and Environmental Management Process (MREMP) is a framework that aims to facilitate the development of mining in NSW in a safe manner such that operations are safe, the environment is protected, the resources are efficiently extracted and rehabilitation achieves a stable, satisfactory outcome (DPI-MR, 2006). The structure and content of the Project MOP and AEMR would be developed in accordance with the MREMP Guidelines (DPI-MR, 2006) and through consultation with various regulatory and advisory agencies including DPI-MR, DECC, DoP and councils.

As Project rehabilitation and remediation activities would be undertaken progressively, the MREMP would be used throughout the Project life to both plan and track the performance of these activities as they are carried out.

Mining Operations Plan

The MOP would provide information in regard to the mining, processing and rehabilitation operations, relevant lease and development conditions, licences and other approvals.

The MOP would also describe:

- area(s) to be disturbed;
- mining, rehabilitation and remediation method(s) to be used and their sequence;
- existing and proposed surface infrastructure;
- progressive rehabilitation schedules;
- areas of particular environmental sensitivity;
- land and water management systems; and
- resource recovery.

The MOP would be revised periodically as well as prior to any significant alteration to Project operations.

Annual Environmental Management Report

An AEMR for the Cadia Valley Operations would continue to be prepared to address the reporting of the status of approvals, leases, licences and environmental risk management and environmental control strategies.

For the preceding 12 month period, the AEMR would provide a summary of community relations and liaison, mine development and rehabilitation in relation to the MOP. Project environmental performance in relation to the collective conditions of approvals, leases and licences for the previous 12 month period would also be reported.

The AEMR would also include a review and any proposed improvements in relation to environmental monitoring and management systems and environmental performance and would specify environmental and rehabilitation targets to be achieved during the ensuing 12 month period.

New Mining Tenements

As described in Section 2.3, CHPL would apply to the DPI-MR for new mining lease areas to the east of the ML 1472 and ML 1481 boundaries (Figure 1-2).

3.3.4 State Environmental Policies

The following SEPPs are relevant to the Project:

- Major Projects SEPP;
- State Environmental Planning Policy No. 33 (*Hazardous and Offensive Development*) (SEPP 33);
- State Environmental Planning Policy No. 44 (*Koala Habitat Protection*) (SEPP 44);
- State Environmental Planning Policy No. 55 (*Remediation of Land*) (SEPP 55); and
- State Environmental Planning Policy (*Mining, Petroleum Production and Extractive Industries*) 2007 (Mining SEPP).

Details of the relevant provisions of these SEPPs are provided in Attachment 3.

3.3.5 Section 94 Contribution Plans

A discussion of the application of section 94 of the EP&A Act to the Project is provided in Attachment 3.

3.4 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT, 1999

The EPBC Act commenced operation on 16 July 2000. The EPBC Act defines proposals that are likely to have a significant impact on one or more matters of national environmental significance as "controlled actions". A proposed project that a proponent thinks may be or is a controlled action must be referred to the Commonwealth Minister for the Environment, Heritage and the Arts (Federal Minister) for determination as to whether or not the project (the relevant action) is a controlled action.

The proposal to extend and operate the existing Cadia Valley Operations to include the Project was referred to the Federal Minister on 18 December 2006. A delegate of the Federal Minster decided on 19 January 2007 that the Project is a 'controlled action' for the purposes of the EPBC Act. The Part 3, Division 1 controlling provisions nominated in respect of the Project were sections 18 and 18A (listed threatened species and communities).

CHPL met with the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) (formerly the Commonwealth Department of the Environment and Heritage [DEH]) in October 2008 to discuss a variation to the existing EPBC Act referral associated with changes to the Project description since the original referral in 2006.

In late October 2008, in accordance with section 156E of the EPBC Act, CHPL lodged a variation to the existing referral with DEWHA.

On 21 November 2008 the variation was approved by the Assistant Secretary of the Environment Assessment Branch of DEWHA. The referral decision and relevant controlling provisions did not change as a result of the approved variation.

The Commonwealth of Australia and the State of NSW governments have signed a bilateral agreement (Bilateral Agreement) which accredits the NSW assessment regime under Part 3A of the EP&A Act for assessment purposes under the EPBC Act. The Bilateral Agreement was signed in January 2007 and applies to actions that the Federal Minister has determined are controlled actions under the EPBC Act. As a result of the operation of the Bilateral Agreement, the Project will only be subject to the environmental assessment process under Part 3A of the EP&A Act, as opposed to the environmental assessment processes under both Part 3A of the EP&A Act and the EPBC Act.

Guideline 1 of Schedule 1 Part A of the Bilateral Agreement states:

> *1. In addition to standard guidelines and directions, the New South Wales Minister, the Director-General or the consent authority must issue guidelines[1] to proponents of controlled actions to ensure that material prepared by the proponent as part of the assessment:*
>
> *(a) contains an assessment of all relevant impacts that the controlled action has, will have or is likely to have;*
>
> *(b) contains enough information about the controlled action and its relevant impacts to allow the Commonwealth Environment Minister to make an informed decision whether or not to approve the controlled action under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999; and*
>
> *(c) addresses the matters outlined in Schedule 4 of the Commonwealth Environment Protection and Biodiversity Conservation Regulations 2000.*

[1] *The New South Wales Minister, the Director-General or the consent authority may issue a generic set of guidelines or may issue guidelines on a case-by-case basis.*

The general content of Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations, 2000* (EPBC Regulations) is included in the Project EARs (Attachment 1). A copy of Schedule 4 of the EPBC Regulations is also provided in full in Table C-1 of Appendix C (EPBC Act Matters), along with a reference list where the applicable content is provided in this EA.

The EARs also require consideration of impacts on the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (Box-Gum Grassy Woodlands and Derived Native Grasslands CEEC) and species potentially present and listed under sections 18 and 18A of the EPBC Act such as the Swift Parrot and Superb Parrot. This is provided in Appendices A and B.

The Project will be assessed in accordance with the Bilateral Agreement and will require approval under both the EP&A Act and the EPBC Act.

3.5 ENVIRONMENTAL ASSESSMENT CONSULTATION

CHPL is committed to an open and constructive consultation programme at the Cadia Valley Operations which aims to:

- identify interested parties and stakeholders;
- inform government and other stakeholders of the nature and status of the Project by presenting information in a number of formats and venues, to facilitate a clear understanding of the Project;
- identify issues of interest or concern to stakeholders for consideration in the Project planning and design process in this EA; and
- continue dialogue between CHPL and government and community stakeholders at the Cadia Valley Operations that would be ongoing, should the Project be approved.

The level of consultation undertaken is considered to be in accordance with the EARs and is appropriate for the preparation of a Major Project under Part 3A of the EP&A Act. It has been conducted in general accordance with the DoP's 2007 *Guidelines for Major Project Community Consultation*. The consultation programme has provided an effective avenue to identify issues of concern or interest to stakeholders and to address these issues in this EA document, where applicable.

The consultation undertaken to date is summarised in the following sub-sections and includes a synopsis of the relevant issues raised. It is anticipated that consultation would continue to be undertaken with government and non-government stakeholders during the assessment of this EA and construction and operation of the Project, should it be approved.

Where key issues raised during Project consultation are described in the following sub-sections, a reference to the relevant section of this EA where the issue is addressed is provided.

3.5.1 Planning Focus Meeting

A Planning Focus Meeting for the Project was held in December 2006. The objective of the Planning Focus Meeting was to familiarise government stakeholders with the Project and to identify key issues that should be considered in the preparation of this EA. The meeting included a site inspection and presentation on the Project and the proposed environmental assessment studies.

The meeting was attended by representatives from each of the following government agencies:

- DoP;
- DECC (formerly the NSW Department of Environment and Conservation [DEC]);
- DWE (formerly the NSW Department of Natural Resources [DNR]);
- DPI-MR, NSW Department of Primary Industries – Agriculture (DPI – Agriculture) and NSW Department of Primary Industries – Fisheries (DPI – Fisheries);
- DEWHA;
- RTA;
- Lachlan Catchment Management Authority (LCMA); and
- BSC.

OCC, Cabonne Shire Council (CSC), NSW Department of Primary Industries – Forests (Forests NSW) and the NSW Heritage Office were also invited to the Planning Focus Meeting, but were not able to attend.

Discussions at the Planning Focus Meeting covered a broad range of issues, including but not limited to the following:

- water supply (Section 2.10);
- surface water investigations and potential impacts (Section 4.3);

- groundwater investigations and potential impacts (Section 4.2);
- air quality/noise emissions and potential impacts (Sections 4.6 and 4.7);
- flora/fauna investigations and potential impacts (Sections 4.4 and 4.5);
- biodiversity offset measures to minimise potential ecological impacts (Sections 4.4.3 and 4.5.3);
- progress of rehabilitation at the Cadia Valley Operations (Section 5);
- potential visual impacts (Section 4.13);
- traffic investigations and potential impacts (Section 4.10);
- potential impacts on heritage values (Sections 4.8 and 4.9);
- potential incremental impacts of the Project and the existing Cadia Valley Operations (Section 4); and
- potential power supply options (Section 2.12.4).

In addition to the Planning Focus Meeting, a range of State, Local and Federal Government agencies were consulted during the development of this EA as described in Sections 3.5.2, 3.5.3 and 3.5.4.

3.5.2 State Government Agencies

The Project was declared a Major Project by the Director-General of the DoP in December 2006 (Section 3.2.1).

Department of Environment and Climate Change

As described in Section 3.5.1 the DECC participated in the Planning Focus Meeting.

CHPL initiated consultation with respect to Project biodiversity offset evaluation with the DECC in 2005 and an initial site visit of the Cadia Valley Operations and review of a possible biodiversity offset area was conducted in April 2006. Subsequent consultation with the DECC during EA preparation included meetings to discuss various offset proposals during 2008 and 2009. Key issues discussed with the DECC during this consultation included, but were not limited to the following:

- management of weeds, bushfire and implementation of relevant environmental management plans for the biodiversity offset proposal (Sections 4.4 and 4.5);
- the area and type of land to be used as the biodiversity offset (Sections 4.4 and 4.5);
- consideration of an additional regional corridor enhancement strategy and/or greenhouse gas offsets (Sections 3.7.1, 4.4 and 4.5);
- consideration of land tenure agreements that could be required as part of the biodiversity offset arrangement (Sections 4.4 and 4.5);
- consideration of using the voluntary biobanking tool to conduct a biodiversity assessment of the proposed offset;
- status of technical environmental assessments; and
- clarification of the Project components described in this EA (Section 2).

Department of Primary Industries – Mineral Resources

As described in Section 3.5.1 the DPI-MR participated in the Planning Focus Meeting.

In addition, the DPI-MR was consulted with respect to a range of ongoing exploration related approvals at the Cadia Valley Operations (e.g. Cadia East Underground Exploration Programme Extension, Big Cadia Exploration Programme and Upper Cadia East and Cadia Hill Deeps Exploration Decline) and the Project during the development of the EA.

Project meetings were periodically held with the DPI-MR during the development of the EA including a technical presentation and initial briefing in October 2006 (prior to the Planning Focus Meeting) and in July, October and November 2008, and in February, March and April 2009 CHPL met with the DPI-MR and presented information regarding timing, Project description and the status of technical environmental assessments.

Key issues discussed with the DPI-MR during this consultation included, but were not limited to the following:

- proposed mining methodology and mineral reserves (Sections 2.2 and 2.5.1);
- treatment of Cadia East ore and modifications to existing infrastructure (Sections 2.7 and 2.12);
- waste rock and tailings management (including potential for acid rock drainage [ARD]) (Sections 2.6, 2.8 and 4.1);
- concentrate handling (Section 2.9);

- evaluation of on-site water supply augmentation options (Section 2.4.4);
- surface water and groundwater modelling and potential impacts (Sections 4.2 and 4.3);
- preliminary air quality and noise monitoring results;
- Project road transport and re-alignment of a section of Cadia Road (Sections 2.12.3 and 4.10);
- power supply approval process (i.e. separate to this EA);
- potential flora and fauna impacts and biodiversity offset discussions (Sections 4.4 and 4.5);
- boundaries of the mine subsidence zone and management concepts (Sections 2.3, 2.5.2 and 5.2.3);
- the Project closure concepts (Section 5); and
- ongoing exploration activities and approvals (Section 2.15).

Department of Primary Industries – Forests

A meeting was held with Forests NSW in March 2009. The meeting was used to provide a general Project update, and to discuss the effect of the subsidence zone, zone of influence and proposed Cadia Road re-alignment on the Monterey Pine (*Pinus radiata*) plantation to the east of the Cadia Valley Operations.

Department of Water and Energy

As described in Section 3.5.1 the DWE participated in the Planning Focus Meeting.

Due to the prevailing climatic conditions, regular discussions were held during the preparation of the EA regarding the Cadia Valley Operations water supply status. In April 2008, the DWE were consulted regarding ongoing exploration approvals such as the Cadia East Underground Exploration Programme Extension.

Specific Project meetings were held with the DWE in October 2008, December 2008, February 2009 where the revised Project description (Section 2), water supply options (Section 2.10), the scope and key findings of the groundwater and surface water technical environmental assessments (Appendices F and G) were presented.

Key issues discussed with the DWE during this consultation included, but were not limited to:

- the reliability of Cadia Valley Operations water supply (Section 4.3.2);
- Project upgrades to the water supply system and increased pumping from the Belubula River (Sections 2.10.2 and 4.3);
- water licensing requirements (Section 4.3.3);
- surface water and groundwater impacts assessment methodology (Sections 4.2 and 4.3); and
- the potential impacts of the Project on surface water and groundwater resources (Sections 4.2.2 and 4.3.2).

Roads and Traffic Authority

As described in Section 3.5.1, the RTA participated in the Planning Focus Meeting.

A Project update briefing and presentation on the EA were conducted with the RTA in October 2008 and December 2008 respectively. The status of the traffic assessment (Appendix I), including discussion of potential traffic impacts in the context of long-term traffic growth were discussed in December 2008.

Key issues discussed with the RTA during this consultation included, but were not limited to:

- consideration of potential traffic impacts associated with the Cadia Valley Operations and Project activities in Blayney (i.e. the CVO Dewatering Facility) (Section 4.10);
- consideration of cumulative traffic impacts with other activities in the region (Section 4.10.2);
- intersection relocation and upgrades associated with the Project (Sections 2.12.2, 2.12.3 and 4.10.2); and
- road safety (Section 4.10).

Lachlan Catchment Management Authority

The LCMA attended the Planning Focus Meeting in 2006 (Section 3.5.1). A further meeting was held with the LCMA in October 2008 where an update on the Project description was presented, and biodiversity offsets were discussed.

Key issues discussed with the LCMA during this consultation included, but were not limited to:

- management of water resources at the Project (Sections 4.2 and 4.3);
- Project biodiversity offset options (Section 3.7.1); and
- rehabilitation of the Project site (Section 5).

Heritage Branch (Department of Planning)

In March 2006, the Heritage Office was integrated as a division of the DoP. A standalone unit also specifically services the ongoing role of the Heritage Council, including overseeing proposed State Heritage listings. The Cadia Engine House and Surrounds is listed on the State Heritage Register. The Cadia Engine House and Surrounds as listed on the State Heritage Register would not be impacted by the Project (Appendix L).

Consultation with the Heritage Branch during the development of the EA has included discussions with respect to the ongoing management of non-Aboriginal heritage items at the Cadia Valley Operations including a site visit and inspection by the Heritage Branch in February 2008, and a further briefing in April 2009. Discussions with the Heritage Branch were also conducted regarding the Big Cadia Exploration Programme in May 2008.

3.5.3 Local Government Agencies

Initial Project briefings were held with the CSC, BSC and OCC in late 2006 via Local Government Steering Committee meetings and executive and councillor briefings.

As described in Section 3.5.1, the BSC participated in the Planning Focus Meeting.

Regular briefings were held with the CSC, BSC and OCC during the development of the EA. This included updates provided at Local Government Steering Committee meetings as well as specific briefings of each council on the Project description, EA status and key findings in October 2008, November 2008 and April 2009.

Employees of the three councils also attend the Cadia Valley Operations Community Consultative Committee (CCC) meetings which are generally held quarterly (Section 3.5.6).

Key issues discussed in consultation with the local government agencies included, but were not limited to:

- EA approval process timing (Section 3);
- waste and tailings management (Sections 2.6 and 2.8);
- description of the ore processing facilities and additional infrastructure (Sections 2.7 and 2.12);
- water supply modifications (including increased usage of Rodds Creek Water Holding Dam and ongoing treated effluent supply) (Section 2.10);
- estimated socio-economic costs and benefits (Sections 4.11 and 4.12);
- flora and fauna assessment scope, impacts and offset options (Sections 4.4 and 4.5);
- air quality, noise and blasting assessments and potential impacts (Sections 4.6 and 4.7);
- surface water and groundwater assessments and potential impacts (Sections 4.2 and 4.3);
- visual assessment and potential impacts (Section 4.13);
- road transport assessment and potential impacts (Section 4.10);
- re-alignment of Cadia Road (Section 2.12.3);
- geochemistry test work findings (Sections 2.6.2 and 4.1);
- potential impacts on heritage items (Sections 4.8 and 4.9); and
- section 94 contributions.

3.5.4 Federal Government Agencies

Department of Environment, Water, Heritage and the Arts

An initial Project briefing of DEWHA advising the Department of the planned referral of the Project under the EPBC Act was conducted in November 2006. DEWHA attended the Planning Focus Meeting and CHPL lodged the EPBC Act referral with DEWHA in December 2006.

On 19 January 2007 the Commonwealth Minister for the Environment and Heritage declared the Project to be a controlled action under section 75 of the EPBC Act, with the controlling provisions being threatened species and threatened ecological communities potentially present and listed under sections 18 and 18A of the EPBC Act (Section 3.4 and Appendix C).

CHPL met with the DEWHA in October 2008 to discuss a variation to the existing EPBC referral associated with changes to the Project description. In late October 2008, in accordance with section 156E of the EPBC Act, CHPL lodged a variation to the existing referral with DEWHA.

On 21 November 2008 the variation was approved by the Assistant Secretary of the Environment Assessment Branch. The referral decision and relevant controlling provisions did not change as a result of the approved variation.

CHPL met with the DEWHA again in March 2009 to provide a Project update, outline the final offset proposal and to provide an overview of the results of the environmental impact assessments.

3.5.5 Infrastructure Owners

Recycled Water Pipelines

BSC owns the pipeline from the Blayney Sewage Treatment Plant to the existing Blayney Dewatering Facility (Section 2.9). The Council has been consulted regarding the Project (Section 3.5.3) and the associated pipeline duplication and development of the CVO Dewatering Facility and associated modification of the water return system (Sections 2.9 and 2.10).

OCC owns the pipeline from the Orange Sewage Treatment Plant to the Cadia Valley Operations (Section 2.1.9). The Council has been consulted regarding the Project (Section 3.5.3) and no alteration of this pipeline is required for the Project.

Blayney Cold Storage and Distribution Warehouses

The Blayney Cold Storage and Distribution warehouses in Blayney are adjacent to the proposed CVO Dewatering Facility site off Newbridge Road and the two facilities would share the use of the proposed rail spur that is included as a component of the Project in this EA (Section 2.4.7). CHPL has consulted with the owners of the Blayney Cold Storage and Distribution warehouses and has entered into relevant agreements for commercial aspects of the proposal.

Electricity Supply

CHPL has consulted with existing and potential energy suppliers regarding the potential electricity demands of the Project and various options for upgrade of the Cadia Valley Operations supply infrastructures as determined by final Project engineering design requirements. This has included lodging connection inquiries with Country Energy and Transgrid and consultation with AGL regarding possible gas supply options.

As described in Section 2.12.4, any upgrades of the Cadia Valley Operations electricity supply system that are required in support of the Project would be subject to separate environmental assessment and approvals.

Road Upgrades

CHPL has consulted with the OCC, BSC and Forests NSW regarding the re-alignment and upgrade of Cadia Road (Section 2.12.3) and the proposed relocation of the Cadia Hill access road intersection with Cadia Road (Section 2.12.2).

3.5.6 Public Consultation and Non-Government Organisations

Cadia Valley Operations Community Consultative Committee

The Cadia Valley Operations CCC was initiated in 2001 following the approval of Ridgeway. Members of the Cadia Valley Operations CCC were selected based on nominations from community members and other stakeholders and include a range of local landholders and representatives of CSC, BSC and OCC.

The Cadia Valley Operations CCC aims to assist with the transfer of information between the local community and CHPL and to provide a forum for constructive consultation regarding environmental issues at the Cadia Valley Operations (including the proposed Project).

The Cadia Valley Operations CCC generally meets quarterly and the minutes of the meetings are mailed to all Cadia district residents for their information.

An initial briefing of the Cadia Valley Operations CCC on the Project was undertaken in August 2006. Subsequent Project updates, description of the environmental assessment process and timing, key milestones and preliminary findings of specialist assessments were undertaken at subsequent CCC meetings.

Key issues raised during CCC meetings are described where relevant below.

Aboriginal Community

Project consultation with Aboriginal stakeholders during the development of the EA and has been undertaken in general accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005a) and *National Parks and Wildlife Act 1974: Part 6 Approvals Interim Community Consultation Requirements for Applicants* (DEC, 2004a).

In accordance with these guidelines identification of indigenous stakeholders was undertaken via:

- public advertisement;
- correspondence with the CSC, BSC and OCC, the DECC, the NSW Department of Aboriginal Affairs and NTS Corp (NSW Native Title Services); and
- correspondence with indigenous stakeholders previously identified by earlier studies at the Cadia Valley Operations (i.e. the Orange Local Aboriginal Land Council [OLALC]).

The OLALC was the only group that registered an interest in being consulted in relation to the Project.

Subsequent consultation with the OLALC during the preparation of the EA included:

- provision of draft Aboriginal heritage assessment methodology to stakeholders and consideration of comments received prior to fieldwork;
- Aboriginal heritage assessment fieldwork with representation from the OLALC;
- discussions with the OLALC regarding the cultural significance of individual Aboriginal heritage sites, the Project area and management of identified lithic items and scarred trees;
- provision of a copy of the draft Aboriginal cultural heritage assessment report to the OLALC for review and comment;
- meetings with the OLALC to discuss the draft Aboriginal cultural heritage assessment report; and
- finalisation of the Aboriginal cultural heritage assessment report including consideration of the comments received from the OLALC.

Further detail is provided in Appendix K, including a letter received from the OLALC in regard to the Project.

Non-Government Organisations

As a component of the consultation programme a number of non-government and community organisations were consulted regarding the Project in the context of future operations at the Cadia Valley Operations. Organisations consulted included:

- Environmentally Concerned Citizens of Orange;
- Orange Field Naturalists;
- Belubula Landholders Association;
- Flyers Creek Landcare Group;
- Regional Water Forum;
- Orange North Rotary Club;
- Orange Chamber of Commerce & Industry;
- Orange Rotary Club;
- Orange Credit Union;
- Orange Daybreak Rotary Club;
- Central West Group Country Women's Association; and
- Springside Progress Association.

Key issues raised during non-government organisation consultation are described where relevant below.

Public Consultation

CHPL regularly updates the community in the vicinity of the Cadia Valley Operations on the status and activities of its operations. Residents meetings have been regularly held since the commissioning of Cadia Hill. For each residents meeting a notice is direct-mailed to more than 170 families in the Cadia, Springside, Flyers Creek, Four Mile Creek, Panuara, Forest Reefs and Errowanbang districts.

Cadia District and Panuara District residents meetings that included discussion of the Project commenced in July and August 2006 and were held periodically during the preparation of this EA. Attendance at these meetings ranged from 13 to 68 attendees from the local community. Issues raised or discussed during the residents meetings were wide ranging and are included where relevant below.

In addition to the residents meetings, CHPL regularly published and distributed a Cadia East Newsletter. The newsletters were distributed in July 2006, December 2006, April 2007, March 2008 and September 2008 by direct mail to more than 170 families in the vicinity of the Cadia Valley Operations. The newsletters were also informally distributed by CHPL to other stakeholders when opportunities arose and/or used as supporting information in individual consultation meetings.

Numerous individual landholder meetings were held with near neighbours of the Cadia Valley Operations in 2006, 2007, 2008 and 2009. Where relevant, aspects of the Project were discussed and issues or concerns raised are included below.

To provide the wider community in the central west of NSW with information on the Project proposal, CHPL provided briefings to the local print, television and radio media in August 2006, October 2008.

Business and Community Attitudes Survey

In 2006/2007 Gillespie Economics completed a *Community Impact Review* (Gillespie Economics, 2007) for the Cadia Valley Operations that included a community and business attitudes survey of the perception of CHPL's socio-economic contributions to the local region and impacts on community infrastructure. The findings of this review were included in the socio-economic assessment of the Project (Appendix H).

Key Issues Raised During Public and Non-Government Organisation Consultation

Key issues discussed in consultation with the public and non-government organisations included, but were not limited to:

- environmental assessment process, consultation and timing (Section 3);
- tailings disposal and waste rock production and other aspects of the Project description (Section 2);
- the Project water supply, options and investigations (Section 2.10);
- surface water investigations, modelling and potential impacts (Section 4.3);
- groundwater investigations, modelling and potential impacts (Section 4.2);
- potential subsidence impacts (Section 2.5.2);
- potential flora and fauna impacts, biodiversity offset investigations and compensatory measures (Sections 4.4 and 4.5);
- potential air quality, greenhouse gas, noise and blasting impacts (Sections 4.6.2 and 4.7.2);
- potential impacts on heritage values and mitigation measures (Sections 4.8 and 4.9);
- potential traffic impacts, including safety and school buses (Section 4.10.2);
- Project landforms and potential visual impacts (Section 4.13.2);
- existing and proposed Project rehabilitation activities (Section 5);
- socio-economic costs and benefits of the Project, including potential impacts on property values (Section 4.11.2 and 4.12.2);
- opportunity for environmental assessment peer review (Section 1.4); and
- Project power demand, supply and potential alternative power sources (Sections 2.12.4 and 3.7.1).

3.6 ENVIRONMENTAL RISK ASSESSMENT

In accordance with the Project EARs (Attachment 1), an ERA was undertaken to identify the potential environmental impacts of the Project and identify key issues for further assessment in the EA. The ERA was conducted on 4 February 2009 and was facilitated by SP Solutions Pty Ltd.

The risk assessment team consisted of representatives from:

- CHPL;
- Gilbert & Associates;
- AGE;
- Dr Noel Merrick;
- Cenwest Environmental Services;
- FloraSearch;
- Wilkinson Murray;
- Traffix; and
- Resource Strategies.

The key environmental issues that were identified by the risk assessment team and the sections of this EA that address these issues are presented in Table 3-2.

Table 3-2
Key Potential Environmental Issues Identified in the Environmental Risk Assessment

Issue/Loss Scenario	Environmental Assessment Section
Reduction in water table and bore yields of existing users.	Appendix G
Extent of subsidence zone potentially larger than predicted.	Section 2.5.2
Potential operational and long-term Flyers Creek flow reduction impacts on existing downstream users.	Appendix F
Potential loss of native flora and fauna including threatened species and communities.	Appendices A and B
Ecosystem function of post-mining rehabilitated landform.	Appendices A, B and P
Final landform rehabilitation success and post-closure landuse.	Appendix P
Short-term and long-term freshwater ecology impacts from loss of flow to Cadiangullong Creek and Flyers Creek.	Appendix A
Potential loss of biodiversity impacts from clearing regionally important native vegetation/habitat.	Appendices A and B
Potential noise impacts at CVO Dewatering Facility.	Appendix D
Confidence of long-term surface water and groundwater modelling predictions (sensitivity).	Appendices F and G

3.7 PROJECT JUSTIFICATION

In accordance with the requirements of the EARs, a justification of the Project on economic, social and environmental grounds, including consideration of alternatives and consideration of the consistency of the Project with the objects of the EP&A Act is provided below.

3.7.1 Consideration of Project Alternatives

Project Location and Scale

Mine planning is a structured process designed to take into account various aspects and issues that may influence a potential mining operation. Aspects vary from mine safety, mineral resource recovery, potential environmental impacts, risks to the operation, mining methods and rates, equipment requirements, development timeframes and economics (i.e. costs of production and capital outlay). In the case of the Project, integration with the existing Cadia Valley Operations mining and ore processing infrastructure, ancillary infrastructure and facilities is also a key factor.

For example, the Project would use and share the vast majority of existing infrastructure at the Cadia Valley Operations and the Project production schedule complements the schedules for Cadia Hill and Ridgeway Deeps (i.e. operation at the Project would increase when ore production at the other operations declines or ceases).

By world standards, the Cadia East deposit comprises a very large, low grade orebody. The scale of a mining project (i.e. factors such as the amount of ore mined/milled each year and the life of the project) is generally dictated by ore grade, safety and efficiencies of mining the host rock, the cost of treatment, the size of the orebody and the calculated pay-back period for return on investment. These characteristics are used to calculate a cut-off grade which defines the magnitude of the operation. The total Cadia East mining reserve comprises approximately 828 Mt of ore (Section 2.2).

CHPL has analysed the Project at a range of scales from small to large scale. When the defining criteria outlined above were included in these analyses, an optimum-sized Project was selected with a total ore processing rate of up to 27 Mtpa. At this rate approximately 450 Mt of ore would be mined over a period of 21 years (Section 1.1.3).

As described above, the measured, indicated and inferred resources at Cadia East greatly exceed the 450 Mt of ore to be extracted by the Project.

However, given future opportunities for additional exploration, feasibility and engineering studies and considering planning timeframes, it was concluded that the approval period being sought by the Project should be limited to 21 years. CHPL does however envisage that the Cadia East orebody would continue to be developed after the initial 21 year period proposed in this EA, subject to suitable future approvals being obtained.

Electricity Supply

While the potential electricity requirements of the Project have been estimated (Section 2.12.4), the final electricity demand would be determined as a component of the Project detailed engineering design. CHPL is currently undertaking concept and pre-feasibility studies of potential power supply upgrade options to increase the power supply reliability for the Cadia Valley Operations during the life of the Project. These include:

- augmentation of the existing 132 kV ETL from Orange; and/or
- construction of a new ETL.

Approval for any off-site augmentation to the Cadia Valley Operations power supply would be sought separately to the Project, and therefore is not assessed in this EA.

On-site distribution upgrades in support of the Project (i.e. additional surface and underground electricity control and reticulation such as transformers, switchyards and buried and overhead transmission lines) are included in the Project.

Mining Method

CHPL has considered a range of alternative mining methods to develop the Cadia East orebody, including open pit and underground methods. This included consideration of:

- a combination of open pit and underground mining methods;
- underground sublevel open stoping mining method;
- underground sublevel caving mining method; and
- underground block/panel caving mining method.

These methods are described further below.

Open Pit Mining

The depth of the Cadia East deposit (i.e. from 200 m to over 1,500 m from the surface) means that the majority of the deposit is not be amenable to open pit mining because the strip ratio (i.e. amount of overburden that would need to be removed to access the ore) is prohibitive.

In the initial Project Application in 2006, a combination of open pit and underground mining was proposed for Cadia East, including the mining of approximately 140 Mt of ore and 310 Mt of waste rock by open pit methods, with an associated significant expansion of the South Waste Rock Dump. However, CHPL's pre-feasibility studies in 2007 and 2008 identified that underground mining methods had the potential to access more of the upper parts of the Cadia East deposit than originally considered practicable. On consideration of a variety of economic and environmental factors a decision was made by CHPL in 2008 to remove the open pit component of the Project.

The removal of the open pit component from the Project has the additional advantage of reducing the need for significant waste rock dump extensions and reduces the potential air quality and noise emissions of the Cadia Valley Operations (Sections 4.6.2 and 4.7.2).

Underground Mining Methods

Sublevel open stoping is also used to mine large orebodies. Pre-production development of the primary stopes consists of an extraction level, access raises and drifts, drill drifts on the sublevels and a slot raise. Individual stopes which may be a few tens of metres in plan dimensions and several tens or even a few hundred metres in height, are fired and the ore extracted through the extraction level in a carefully designed sequence. In most cases, mined-out primary stopes are backfilled with cemented waste rock and/or tailings. Secondary stopes, and in some cases tertiary stopes, are mined between the backfilled stopes. The backfilling of the stopes generally precludes subsidence occurring above the mine workings.

In sublevel caving, development in the orebody is undertaken by driving a series of parallel drill headings on the sublevels which are spaced at comparatively small vertical intervals (e.g. tens of metres). Ore is fragmented by blast holes drilled upwards from the drill headings. As ore is drawn from a heading, fragmented ore and the enclosing host rock caves to fill the temporary void. This mining method is suitable for steeply dipping orebodies and is employed at Ridgeway.

Under suitable circumstances, block and panel caving methods are cheaper and more productive than the other underground mass mining methods.

Panel caving proceeds by advancing the undercut in a diagonal front across adjacent panels (Section 2.5.1). Panel caving methods of underground mining can be used to mine large, low grade orebodies profitably with lower mining costs than other methods of underground mining and in many cases comparable with or lower than those of open pits. Further detail on the panel caving method proposed for the Project is provided in Section 2.5.1.

As described above, sublevel open stoping is a backfilled mining method that would not result in the development of a subsidence zone and associated loss of vegetation at the surface, or the requirement to re-align Cadia Road. It would also preclude the long-term formation of a waterbody in the subsidence zone. Both the sublevel caving and the panel caving mining methods would result in the development of a subsidence zone at the surface.

CHPL has evaluated the use of stoping and caving mining methods at Cadia East. Based on these evaluations CHPL has determined that sublevel open stoping is not a suitable mining method to achieve the throughput rates required to make the Project viable (due to the low grade of the deposit). Block and panel caving methods are both considered by CHPL to be technically feasible, however CHPL has decided to adopt the panel caving mining method for the Project due to this method presenting the highest resource recovery and production rate and the lowest mining cost. The panel caving method is highly efficient and would result in a high percentage of the deposit being extracted without the need for open pit development.

Tailings Management

Approximately 450 Mt of tailings would be produced over the life of the Project (Section 2.8). A number of options were considered to accommodate these additional tailings including:

- co-disposal with waste rock in the Cadia Hill open pit;
- development of another tailings storage facility (Far South Tailings Storage Facility [FSTSF]); and
- extension of the existing storage facilities via raising of embankments with supplementary embankments where required.

Following the decision not to use open pit mining as a mining method to access the upper portion of the Cadia East orebody (described above), the co-disposal of waste and tailings in the Cadia Hill open pit was no longer considered a viable option as the total production of waste rock would only be minor (i.e. up to 11.4 Mt) over the life of the Project (Section 2.6.1).

While the Cadia Hill open pit could potentially be used for direct deposition of tailings, part of the open pit would be affected by the proposed subsidence zone (Section 2.5.2) and tailings materials if unconsolidated, could potentially flow into the Cadia East underground mine, with associated water management and safety issues. This option was therefore not adopted for the Project. In addition, deposition of tailings within the Cadia Hill open pit could potentiality sterilise mineralisation that is known to extend beneath the base of the pit. The Upper Cadia East and Cadia Hill Deeps underground exploration decline is being developed to allow further exploration drilling and bulk sampling of this area (Section 2.1.3).

Significant additional tailings storage capacity for the Cadia Valley Operations could be provided if CHPL were to construct a third tailings storage facility on the lower section of Rodds Creek (i.e. the FSTSF). Construction of the FSTSF would however involve the development of a new disturbance area to the south of the existing Cadia Valley Operations and would also require a significant volume of waste rock to construct the starter embankments. While the FSTSF is considered to be a viable tailings storage option, subsequent investigations of the storage efficiency, storage density and depositional behaviour of extending the existing STSF and NTSF indicates that with suitable extensions, the existing facilities could accommodate the Project tailings material (Section 2.8 and Appendix O) without the need for a third tailings storage facility.

Environmental benefits of the extension of the existing STSF and NTSF facilities rather than development of an additional FSTSF storage include less land disturbance, and retention of the Cadia Valley Operations tailings management activities largely within the existing limits as defined by the STSF embankments and Cadia Road.

Ore Processing Facilities Upgrades

As described above and in Section 2, CHPL investigations indicate an optimum ore production and processing rate of 27 Mtpa.

Given the existing processing capacity (24 Mtpa) and the harder ore that would be produced by the Project, upgrades would be required to the existing ore processing facilities. Two key alternatives were considered for the required Project additional processing capacity:

- significant upgrades of the existing low grade and high grade processing plants to facilitate the expanded production capacity and the handling of harder Project ores; or
- development of a third processing plant and a limited upgrade of the existing low grade processing plant.

As CHPL is still to fully complete these aspects of the Project feasibility study, both of the above alternatives are proposed as options for the Project (Section 2.7). There is little material environmental difference between either of these options, as they would both involve on-site construction activities near the existing ore processing facilities and a Project processing rate of 27 Mtpa.

Water Supply

Water demand at the Project would increase in line with the increased production capacity of the Project and approximately an additional 6 ML per day of make-up water is estimated to be required (Section 2.10).

A number of options were considered for the augmentation of the Cadia Valley Operations water supply system to provide the additional make-up water required at a suitable reliability over a range of climatic conditions. These new water source options included the development of:

- a pipeline and transfer of water from the flooded Browns Creek Mine;
- a pipeline and groundwater borefield in Spring Hill;
- a pipeline for the transfer of treated effluent from Bathurst Sewage Treatment Plant;
- a pipeline to facilitate extractions from Lake Rowlands; and
- development of a pipeline and extraction from Wyangala Dam.

The options above would involve significant additional infrastructure and associated land access, licensing and environmental approvals.

A series of potential improvements to the existing Cadia Valley Operations water management system were also investigated to ascertain whether the existing system could be augmented to improve the supply of water to address the marginal increases required by the Project upgrades, at a suitable level of reliability.

The findings of this investigation indicated that no new water supply sources would be required for the Project if the existing water management system was augmented to improve harvesting of water in accordance with CHPL's existing water extraction licences. On this basis the augmentations of the existing system as described in Sections 2.10 and 2.11 were adopted.

Cadia Hill Access Road

As described in Section 2.12.2, part of the existing Cadia Hill access road is located within the proposed Cadia East subsidence zone.

A number of options were considered to provide alternative access to the ore processing facilities and existing administration and workshop areas at the Cadia Valley Operations.

These included:

- relocation of administration and other facilities to an alternative location (e.g. North Waste Rock Dump) with an associated new intersection on Cadia Road to the north of its existing location;
- development of an internal access road from the Ridgeway access road to the existing facilities; and
- relocation of the Cadia Hill access road to the south of its existing location (including sealing of an additional section of Cadia Road and relocation of the existing intersection).

There are no significant environmental advantages or impacts associated with any of the above options. The third option was adopted and the relocated road would traverse the South Waste Rock Dump and the Rodds Creek Water Holding Dam embankment and therefore make use of existing disturbance areas and mine landforms (Section 2.12.2).

Mineral Concentrate Transport to Blayney

The Cadia Valley Operations with the Project at full production would produce more mineral concentrate than the existing concentrate pipeline can accommodate (Section 2.4.7). While road tanker transport of the additional concentrate was evaluated, this was not considered to be a long-term solution and duplication of the existing concentrate pipeline was adopted as the preferred management option (Section 2.4.7).

Dewatering Facility Capacity

As described in Section 2.4.7, the existing Blayney Dewatering Facility does not have sufficient capacity to accommodate the peak concentrate production of the Cadia Valley Operations incorporating the Project. Three main options were considered for the management of this issue:

- expansion of the existing facility;
- duplication of the existing facility, allowing simultaneous operation of two dewatering facilities; and
- development of a new, significantly larger dewatering facility and eventual decommissioning of the existing facility.

Given consideration of the location of the existing Blayney Dewatering Facility in close proximity to the suburban areas of Blayney and noise-related issues associated with rail loading and operation of the facility at the current operational levels, it was considered that development of a new larger facility was the preferred option. The new CVO Dewatering Facility is located on Newbridge Road adjacent to the Blayney Cold Storage and Distribution warehouses, well removed from the urban areas of Blayney (Section 2.4.7).

Enhancement and Offset Conservation Areas

Offset Area

At the early stages of Project evaluation, CHPL recognised that the provision of a biodiversity offset would be a key component of the Project.

In 2005 and 2006, CHPL and its specialist botanist-ecologist systematically evaluated 52 potential offset areas located within a 50 km radius of the Cadia Valley Operations. Through this process, a potentially suitable offset area was identified at Black Rock Range, located approximately 11 km to the west.

CHPL has also evaluated whether a suitable offset could be formulated on current CHPL-owned lands in the Cadia Valley, but it was concluded that a more suitable and robust offset could be located on Black Rock Range and surrounding land.

3.7.2 Ecologically Sustainable Development Considerations

The concept of sustainable development came to prominence at the World Commission on Environment and Development 1987, in the report entitled *Our Common Future*, which defined sustainable development as:

> *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

In recognition of the importance of sustainable development, the Commonwealth Government developed a National Strategy for Ecologically Sustainable Development (NSESD) (Commonwealth of Australia, 1992) that defines ESD as:

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

The NSESD was developed with the following core objectives:

- enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- provide for equity within and between generations; and
- protect biological diversity and maintain essential processes and life support systems.

In addition, the NSESD contains the following goal:

> *Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*

In accordance with the core objectives and a view to the achieving this goal, the NSESD presents private enterprise in Australia with the following role:

> *Private enterprise in Australia has a critical role to play in supporting the concept of ESD while taking decisions and actions which are aimed at helping to achieve the goal of this Strategy.*

Australia's commitment to the principles of ESD is considered in the EPBC Act, which defines principles of ESD:

> *(a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;*
>
> *(b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*
>
> *(c) the principle of inter-generational equity – 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;*
>
> *(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;*
>
> *(e) improved valuation, pricing and incentive mechanisms should be promoted.*

For the purposes of this EA, the relevant definition of ESD is that in section 6(2) of the *Protection of the Environment Administration Act, 1991*, which is the definition adopted by the EP&A Act. This definition provides as follows:

> *Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:*
>
> *(a) the precautionary principle – namely, that if there are threats of serious or irreversible environmental 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, public and private decisions should be guided by:*
>
> *(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
>
> *(ii) an assessment of the risk-weighted consequences of various options.*
>
> *(b) inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*
>
> *(c) conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
>
> *(d) improved valuation, pricing and incentive mechanisms – namely, that environmental factors should be included in the valuation of assets and services, such as:*
>
> *(i) polluter pays – that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
>
> *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
>
> *(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

Ecologically Sustainable Development Assessment

Project design, planning and assessment have been carried out applying the principles of ESD, through:

- incorporation of risk assessment and analysis at various stages in the Project design and environmental assessment and within decision-making processes;
- adoption of high standards for environmental and occupational health and safety performance;
- consultation with regulatory and community stakeholders;
- assessment of potential greenhouse gas emissions associated with the Project; and
- optimisation of the economic benefits to the community arising from the development of the Project.

Assessment of potential long-term impacts of the Project was carried out during the preparation of this EA on aspects of topography and visual aspects, surface water, groundwater, ecology (including flora and fauna), air quality (including greenhouse gas emissions), noise, heritage, road transport and socio-economics.

The Project design takes into account biophysical considerations, including the principles of ESD as defined in section 6(2) of the *Protection of the Environment Administration Act, 1991*.

In addition, it can be demonstrated that the Project can be operated in accordance with ESD principles through the application of mitigation and management measures to minimise environmental impacts during the construction and operation of the Project (Section 4).

The following sub-sections describe the consideration and application of the principles of ESD to the Project.

Precautionary Principle

Environmental assessment involves predicting what the environmental outcomes of a development are likely to be. The precautionary principle reinforces the need to take risk and uncertainty into account, especially in relation to threats of irreversible environmental damage.

A Preliminary Hazard Analysis (PHA) (Appendix M) and ERA (Appendix N) were conducted to identify risks and develop appropriate mitigation measures and strategies. The PHA considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). The PHA does not consider those risks that are not atypical, or abnormal (e.g. long-term effects of dust emissions on adjacent vegetation).

The ERA addresses potential environmental impacts associated with the Project, including long-term effects. In addition, longer-term expected risks are considered by the specialist studies conducted in support of this EA (Section 4 and Appendix N).

The specialist assessments, PHA and ERA, have evaluated the potential for harm to the environment associated with development of the Project and have identified measures that can be implemented to minimise harm where practicable.

Measures have been adopted as components of the Project design to minimise the potential for serious and/or irreversible damage to the environment, including the development of environmental management and monitoring and compensatory measures that would be implemented during construction and operation of the Project (Section 4).

Social Equity

Social equity is defined by inter-generational and intra-generational equity. Inter-generational equity is the concept 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, while intra-generational equity is applied within the same generation.

The principles of social equity are addressed through:

- assessment of the socio-economic impacts of the proposal, including the distribution of impacts between stakeholders and the potential socio-economic impacts of carbon pollution (Appendix H);
- management measures to be implemented in relation to the potential impacts of the Project during construction and operation on land resources, water resources, visual amenity, noise, air quality, flora and fauna, road transport, hazards and risks and socio-economics (Section 4);
- implementation of environmental management and monitoring initiatives (Section 4) to minimise potential environmental impacts (which include environmental management and monitoring programmes to be implemented over the Project life); and
- implementation of a programme of offset/compensatory measures during the life of the Project to compensate for potential ecological impacts that have been identified for the on-site development (Section 4 and Appendices A and B).

In particular, the Project would benefit current and future generations through the provision of continued significant employment and regional expenditure at the Cadia Valley Operations for the duration of the Project. Flow-on employment and production effects would also be significant (Appendix H and Sections 4.11 and 4.12).

Based on experience during the development of Cadia Hill and Ridgeway, the Project would continue to provide a significant stimulus to local and regional economies and provide NSW export earnings and royalties, thus contributing to future generations through social welfare, amenity and infrastructure provisions.

The Project incorporates a range of environmental management and mitigation measures to minimise potential impacts on the environment. The costs of these measures would be met by CHPL. These costs have been included in the economic assessment where practicable (Appendix H), the potential benefits to current and future generations have therefore been calculated in the context of the mitigated Project, where environmental impacts have been minimised.

Conservation of Biological Diversity and Ecological Integrity

Biological diversity or 'biodiversity' is considered to be the number, relative abundance, and genetic diversity of organisms from all habitats (including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part) and includes diversity within species and between species as well as diversity of ecosystems (Lindenmayer & Burgman, 2005).

For the purposes of this EA, ecological integrity will be considered in terms of ecological health and ecological values.

While the Project area comprises primarily agricultural lands, there are areas of remnant vegetation that are of importance in the context of the primarily cleared landscape of the Cadia Valley. On this basis the Project area has recognised ecological values, which include the presence of threatened species and one threatened endangered ecological community listed under each of the *Threatened Species Conservation Act, 1995* (TSC Act) and EPBC Act (i.e. two listings of Box Gum Woodlands) (Appendices A and B and Sections 4.4 and 4.5).

The existing flora and fauna species richness (i.e. total number of species) present in the Project area and/or immediate surrounds is 330 native flora species and 206 native vertebrate fauna species, respectively (Appendices A and B).

The environmental assessments described in Sections 4.4 and 4.5 (and Appendices A and B) describe the potential impacts of the Project on the biological and ecological environment.

In accordance with ESD principles, the Project addresses the conservation of biodiversity and ecological integrity by proposing an environmental management framework designed to conserve ecological values where practicable.

Project infrastructure would be designed to minimise impacts on the existing environment where practicable. For example, dust controls would be employed that would minimise potential impacts on surrounding vegetation. Further details of how the Project infrastructure would be designed to minimise impacts on the environment, including potential impacts on threatened species, are provided in Sections 4.4 and 4.5.

Proven operating systems and pollution control structures would be applied where practicable. The potential for environmental degradation would be minimised through training of personnel, environmental auditing and the development of contingency plans in case of an emergency which is likely to impact on the environment. Environmental monitoring would be undertaken to determine whether the environmental control measures are operating effectively. Further details of environmental management and monitoring are provided in Section 4.

As discussed in Sections 4.4.3 and 4.5.3, the Project would include a programme of compensatory measures to address on-site impacts.

<u>Greenhouse Gas Emissions</u>

The effects of global warming are tangible in Australia as well as internationally. Natural ecosystems are considered to be vulnerable to climate change. Patterns of temperature and precipitation are key factors affecting the distribution and abundance of species (Preston and Jones, 2005). Projected changes in climate will have diverse ecological implications. Habitat for some species will expand, contract and/or shift with the changing climate, resulting in habitat losses or gains, which could prove challenging, particularly for species that are threatened.

Human-caused Climate Change is listed as a Key Threatening Process under the TSC Act and Loss of Climatic Habitat Caused by Anthropogenic Emissions of Greenhouse Gases is listed as a Key Threatening Process under the EPBC Act.

In making its final determination to list anthropogenic climate change as a key threatening process, the NSW Scientific Committee (2000a) found that:

1. The distribution of most species, populations and communities is determined, at least at some spatial scale, by climate.
2. Climate change has occurred throughout geological history and has been a major driving force for evolution.
3. There is evidence that modification of the environment by humans may result in future climate change. Such anthropogenic change of climate may occur at a faster rate than has previously occurred naturally. Climate change may involve both changes in average conditions and changes to the frequency of occurrence of extreme events.
4. Response of organisms to future climate change (however caused) is likely to differ from that in the past because it will occur in a highly modified landscape in which the distribution of natural communities is highly modified. This may limit the ability of organisms to survive climate change through dispersal (Brasher and Pittock, 1998; Australian Greenhouse Office [AGO], 1998). Species at risk include those with long generations, poor mobility, narrow ranges, specific host relationships, isolated and specialised species and those with large home ranges (Hughes and Westoby, 1994). Pest species may also be advantaged by climate change.

A greenhouse gas assessment was undertaken by Holmes Air Sciences for the Project (Appendix E) in accordance with the EARs. Valuation of potential greenhouse gas emission damage costs has been incorporated in the Socio-Economic Assessment (Appendix H) for the Project as described below. The potential implications of climate change on water supply is addressed in the Surface Water Assessment (Appendix F).

Measures to Maintain or Improve the Biodiversity Values of the Surrounding Region

A range of impact avoidance, mitigation and offset measures would be implemented for the Project to maintain or improve the biodiversity values of the surrounding region in the medium to long-term.

Impact avoidance measures which would be implemented for the Project include minimising disturbance to native vegetation and control of weeds and pests. Examples of impact mitigation measures include wildlife corridor creation on CHPL-owned land and on-site flora and fauna management. Measures which would be implemented to offset the flora and fauna impacts include:

- Rehabilitation of post-mining landforms - The Project disturbance areas (e.g. tailings storage facilities and infrastructure areas) would be rehabilitated and revegetated. The revegetation programme for the Cadia Valley Operations would provide for a combination of woodland and native grassland habitats as well as facilitating landscape connectivity through its concurrent contribution to the local and regional habitat corridor network.
- Provision of a Squirrel Glider monitoring programme - A monitoring programme would be prepared to confirm the presence of a viable population of the Squirrel Glider within the Project area, determine their habitat usage and extent of available habitat resources, and evaluate future management options.
- Enhancement and conservation of vegetation and habitat within the Black Rock Range offset area as discussed further below.

An offset area is proposed, which is located approximately 11 km west of the Cadia Valley Operations on Black Rock Range. The offset area would be secured and managed in perpetuity for conservation purposes.

A management plan would be prepared which would detail measures including: provision of appropriate fencing to exclude grazing and assist natural regeneration, native revegetation plantings using a local seed source, soil erosion management, weed and pest management, fire management and restricted access.

The general flora and fauna attributes of the offset area are:

- significant areas of existing native vegetation communities would be enhanced (approximately 653 ha) and significant areas of cleared agricultural land would be revegetated (approximately 173 ha);

- the vegetation communities within the offset area are similar in that which would be cleared for the Project;
- the area suitably offsets the Project impacts on matters protected by the EPBC Act, by enhancing substantial areas of existing Box-Gum Grassy Woodlands and Derived Native Grasslands CEEC and foraging habitat for threatened woodland birds (i.e. Superb Parrot and Swift Parrot);
- significant areas of existing Box-Gum Woodland occurs in the offset area, approximately 210 ha meets the criteria of the White Box/Yellow Box/Blakely's Red Gum Woodland Endangered Ecological Community (Box-Gum Woodland EEC) listed under the TSC Act and approximately 154 ha meets the criteria of the Box-Gum Grassy Woodlands and Derived Native Grasslands CEEC;
- threatened fauna recorded within the offset area or adjoining habitat are: Rosenberg's Goanna, Superb Parrot, Barking Owl, Brown Treecreeper (eastern subspecies), Speckled Warbler, Diamond Firetail, Eastern Bentwing-bat, and Yellow-bellied Sheathtail-bat; and
- the offset area also provides potential habitat for other threatened fauna species recorded in the Project area (e.g. Swift Parrot and Squirrel Glider).

Overall, the surveys indicated that the habitat within the offset area is considered of relatively high conservation value when compared to the habitat which would be cleared for the Project. The flora and fauna assessments for the Project (Appendices A and B) state that it is likely that the proposed offset measures would constitute a suitable offset against residual flora and fauna impacts associated with the Project, given the anticipated improvement in the flora and fauna habitat value of the land within the offset area in the medium to long-term.

The measures to maintain or improve the biodiversity values of the surrounding region are further described in Sections 4.4 and 4.5.

Valuation

One of the common broad underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Resources should be carefully managed to maximise the welfare of society, both now and for future generations.

In the past, some natural resources have been misconstrued as being free or underpriced, leading to their wasteful use and consequent degradation. Consideration of economic efficiency, with improved valuation of the environment, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environmental considerations in decision making, as required by ESD.

While historically, environmental costs have been considered to be external to project development costs, improved valuation and pricing methods attempt to internalise environmental costs and include them within project costing.

The Socio-Economic Assessment (Appendix H) undertakes an analysis of the Project and attempts to incorporate environmental values via direct valuation where practicable (e.g. greenhouse gas emissions of the Project) or indirectly via the threshold value method, where the trade-off between net production benefits and environmental impacts is considered. Furthermore, wherever possible, direct environmental effects of the Project are internalised through the adoption and funding of mitigation measures by CHPL to mitigate potential environmental impacts (e.g. land acquisitions or heritage management works).

Greenhouse gases directly generated by the Project (i.e. Scope 1 emissions) on average are estimated at approximately 0.04 Mt carbon dioxide equivalent per annum ($CO_{2\text{-}e}$ pa) (Appendix E). Indirect emissions associated with the on-site use of fuel and electricity, transport, etc. (i.e. Scope 2 and Scope 3 emissions) are estimated on average to be 1.37 Mt $CO_{2\text{-}e}$ pa (Appendix E).

The benefit cost analysis in Appendix H indicates a very large net production benefit of approximately $1,210 million (M), and a net benefit of approximately $745M (including the conservative damage costing of all of the greenhouse gas emissions described above) would be forgone if the Project is not implemented.

Any residual environmental impacts of the Project after mitigation would need to be valued higher than $745M, to make the Project undesirable from an economic efficiency perspective (Appendix H).

3.7.3 Consideration of the Project Against the Objects of the EP&A Act

The EARs (Section 1.2) require consideration of the consistency of the Project with the objects of the EP&A Act. Section 5 of the EP&A Act describes the objects of the EP&A Act as follows:

(a) to encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

(iii) the protection, provision and co-ordination of communication and utility services,

(iv) the provision of land for public purposes,

(v) the provision and co-ordination of community services and facilities, and

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

(vii) ecologically sustainable development, and

(viii) the provision and maintenance of affordable housing, and

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The Project is considered to be generally consistent with the objects of the EP&A Act, because it is a Project which:

- incorporates:
  - measures for the management and conservation of resources including water and natural areas (Section 4);
  - development of the State's mineral resources (i.e. gold, copper and molybdenum resources);
  - measures to minimise potential amenity impacts associated with surface activities in the Cadia Valley Operations and at the CVO Dewatering Facility (Section 4.13);
  - significant continued employment and other socio-economic benefits to the community (Sections 4.11 and 4.12);
- includes the economic use and development of land, while maintaining key existing landuses including agricultural uses on surrounding CHPL owned land and would extend the life of the Cadia Valley Operations;
- incorporates measures to manage and protect the existing communication and utility services in the Cadia Valley Operations area that may potentially be subject to adverse effects associated with the Project extensions (e.g. management of roads, pipelines and electricity transmission lines during construction of the second concentrate pipeline);
- includes measures to minimise potential amenity impacts (e.g. air and noise emissions) on public land in the vicinity of the Project (e.g. road reserves);
- would support the ongoing provision of community services and facilities through significant contributions to State royalties, State taxes, Commonwealth tax revenue and any applicable section 94 contributions (Attachment 3 and Sections 4.11 and 4.12);
- incorporates a range of measures for the protection of the environment, including the protection of native plants and animals, threatened species, and their habitats (Sections 4.4.3 and 4.5.3);
- incorporates relevant ESD considerations (Section 3.7.2);
- is a Major Project that would be determined by the Minister for Planning (Section 3.2), however feedback and consultation with Local Government agencies and Federal Government agencies has been undertaken where relevant (Section 3.5); and
- involves public involvement and participation though the Project EA consultation programme (Section 3.5.6), which would be ongoing following the public exhibition of the EA document and DoP assessment of the Project in accordance with the requirements of the EP&A Act.

3.7.4 Summary Consideration of the Potential Impacts and Benefits of the Proposal

Uses of Metal Products

The Project would allow the continuation of production of gold/copper concentrates (and gold bullion) for export to overseas refineries, and would also facilitate the production of molybdenum concentrates for processing in Australia. There is strong demand for these concentrates, because the metals that are produced from these concentrates are valuable globally traded commodities.

Gold

Most of the gold that is produced today is used in the fabrication of jewellery (DPI, 2008). However, because of its superior electrical conductivity and resistance to corrosion and other desirable combinations of physical and chemical properties, gold is also an essential industrial metal. Gold performs critical functions in computers, communications equipment, spacecraft, jet aircraft engines, and a host of other products (DPI, 2008). Although gold is important to industry and the arts, it also retains a unique status as a long-term store of value and until recently, most of the bullion produced each year went into the vaults of government treasuries or central banks. Gold is also often used as a hedge against both inflation and economic downturn.

Copper

Copper is a major industrial metal, ranking third after iron and aluminium in terms of quantities consumed. Its importance reflects its useful properties (either alone or in combination with other metals) of high ductility, malleability, and its resistance to corrosion (DPI, 2008). Electrical uses of copper, including power transmission and generation, building wiring, telecommunication, and electrical and electronic products, account for about 75% of total copper use (DPI, 2008). Building construction is the single largest market, followed by electronics and electronic products, transportation, industrial machinery, and consumer and general products.

Molybdenum

The majority of molybdenum produced is used to make stainless steel (25%) and other iron-based alloys such as construction steel, tool and high speed steel and cast iron (about 50%) (International Molybdenum Association [IMOA], 2008).

Molybdenum is also used in some lubricants and in various industrial and electrical manufacturing processes (e.g. production of integrated circuits, coatings, etc.) due to its chemical and physical properties. Due to its tolerance of high temperatures and favourable physical properties in a range of alloys, molybdenum metal is used in a range of high temperature applications such as glass manufacture, lighting, aerospace industries and metal and chemical manufacturing (IMOA, 2007).

Consideration of Potential Environmental Impacts, Mitigation Measures and Environmental Management

An assessment of the potential impacts and benefits of the proposal has been conducted in this EA and associated supporting studies. The following text provides a brief overview of the findings of this EA.

The EARs for the Project outline key environmental issues which the Director-General of the DoP has specified must be addressed by this EA. Table 1-3 provides a summary of the EARs and a reference to the relevant section of this EA where the issues are addressed.

In accordance with the requirements of the EARs, an ERA has been conducted for the Project (Section 3.6 and Appendix N). The key potential environmental issues identified by the ERA and the section of this EA where the issues are addressed are provided in Table 3-2.

A summary of environmental issues raised during consultation with government and non-government stakeholders and the sections of this EA where they are addressed is provided in Section 3.5.

As described in Section 3.7.2, the Project would be developed and operated in accordance with ESD principles.

Section 4 of this EA provides comprehensive consideration of the potential environmental impacts and environmental mitigation and management measures for the potential impacts of the Project. Section 5 provides a description of the rehabilitation that would be employed at the Project.

A summary of the mitigation measures, environmental management and monitoring programmes is provided in Section 6 (Statement of Commitments).

Consideration of Potential Socio-Economic Benefits

Peak employment at the Project (i.e. Year 2) is expected to result in the development of an additional 444 direct and indirect jobs (Appendix H). After three years of the Project, employment levels would return to current levels and thereafter decrease to approximately 783 people between Years 10 and 21.

Employment and expenditure associated with the Project operations is expected to have even more significant flow-on effects in the regional economy. The Socio-Economic Assessment (Appendix H) indicates that operation of the Project is likely to result in an average annual stimulus of approximately 1,889 direct and indirect jobs in the region. The Project would also make significant contributions to regional output or business turnover and household income (Sections 4.11 and 4.12).

The benefit cost analysis in Appendix H indicates a very large net production benefit of approximately $1,210M, and a net benefit of approximately $709M would be forgone if the Project is not implemented.

3.7.5 Consequences of not Proceeding with the Project

In accordance with the EARs (Section 1.2), consideration of the consequences of not proceeding with the Project are provided below.

The assessment in this EA indicates that if the Project were not to proceed, the following consequences are implied:

- a significant reduction in the Cadia Valley Operations workforce would occur in or about Year 4 (i.e. 2013) with the planned closure of Cadia Hill;
- at the cessation of the approved Ridgeway Deeps in Year 8 (i.e. 2017), the Cadia Valley Operations would close and the remaining open areas of the site would be rehabilitated;
- Project construction activity and associated employment and regional expenditure effects would not occur;
- Project related extensions of the significant CHPL direct and indirect operational employment in the region would not occur;
- significant CHPL regional expenditure over the Project life would not occur;
- the NSW government would not benefit from the royalties associated with the production of gold, copper and molybdenum from the Cadia East orebody;
- the Federal Government would not benefit from the taxes associated with Project gold, copper and molybdenum production; and
- the potential environmental impacts of the Project (Section 4), including the loss of native vegetation (including State and Commonwealth listed Box-Gum Woodland native vegetation communities), and localised alteration of surface water and groundwater regimes (Sections 4.2.2 and 4.3.2), would not occur.